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Safety

**USAF SAFETY DEPLOYMENT AND
CONTINGENCY PAMPHLET**

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This pamphlet is an aggregate of many documents, deployment guides, technical orders (TO), Air Force Instructions (AFI), and Air Force Occupational Safety and Health (AFOSH) standards too numerous to reference. This pamphlet is not intended to replace any existing document or the mandatory compliance with any document. Compliance with this pamphlet is not mandatory. It is intended to assist commanders, commander's representatives, planners, supervisors, and all those concerned with the safety and health of Air Force Resources. It most assuredly is to be used by safety and health professionals in mishap prevention and the evaluation and mitigation of risks associated with deployments and contingencies. We must strive to keep losses from happening on any future contingency. We can do this by: using Operational Risk Management (ORM) principles (see chapter 2) to make informed decisions; establishing and enforcing high standards of performance; creating a command climate of "tough caring;" and recognizing the effects of stress and fatigue on performance. Let us not forget that mishap prevention is an important weapon in our arsenal. This pamphlet is a quick reference intended to help in preventing mishaps during contingency operations and to multiply our combat power by preserving our assets. (Use the information provided here in the context in which it is given.)

Major commands (MAJCOM), direct reporting units (DRU), and field operating agencies (FOA) may supplement this pamphlet as needed. Send comments and suggested improvements to Headquarters Air Force Safety Center, Ground Safety Division, Safety Engineering and Standards Branch (HQ AFSC/SEGS), 9700 G Avenue, SE, Suite 222, Kirtland AFB NM 87117-5670, on Air Force (AF) Form 847, **Recommendation for Change of Publication**.

The ability of a unit to conduct a successful safe operation through all phases of deployment and employment depends on the adequacy of individual staff efforts in planning and training. Operation Plans (OPLAN) should be studied to determine deployment configurations and missions to be supported, and each annex to the Installation Deployment Plan (IDP) should be tailored to support specific requirements or concepts of operation. Thorough and complete deployment planning is essential and can be realized through quality review, base exercises, and evaluation by commanders and staff agencies. The host unit commander and (or) deployment commander are the process owners and should ensure local deployment guidance defines the process and procedures to deploy forces.

No TO, AFI, AFOSH standard, operating instruction, or pamphlet can possibly address every hazard or potential hazard that may arise from a specific task or combination of tasks. Where situations exist that do not appear to be adequately covered by existing directives, use an ORM process to assess risk associated with those situations and determine adequate safeguards or procedures to manage the risk. **NOTE:** The ORM process may not be used to violate directives or other regulatory guidance. Normal waiver or variance procedures must be followed in all cases.

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Chapter 1

INTRODUCTION

1.1. Safety Planning in Contingency Operations. Safety planning and Operational Risk Management (ORM) can prevent the accidental destruction or loss of aerospace forces used to carry out an assigned mission. The safety planner must recognize necessary planning variations in wartime, be fully aware of the commander's analysis of the mission, and make safety plans that promote mission objectives.

1.1.1. Time, location, facilities, environmental conditions, equipment, and mission urgency can make it necessary to accept certain hazards and risks to achieve the necessary objectives.

1.1.2. All safety standards and programs must be considered during mission planning. Certain missions may, however, require acceptance of unavoidable risks to reach primary mission objectives. As part of ORM, prior to acceptance of any risk, ensure the decision to accept risk has been made at the appropriate level.

1.1.3. The acceptance of hazards or risks under certain conditions does not mean they should be allowed to become operational norms. When full safety compliance cannot be maintained, every available and practical measure must be applied to reduce or control the risk.

1.1.4. When the need for noncompliance no longer exists, standard safety procedures must be reinstituted. When risks or hazards are accepted, all personnel involved in the operation should be completely informed of what these conditions are, why they exist, what adverse effects they may create, and how to best cope with them.

1.2. Mission Analysis:

1.2.1. It is important to review as many aspects of the deployment or contingency as possible and analyze them, prior to departure, as this will enable correction to many problems. Failure to advise the planners and mission commanders of possible problems could result in an unnecessary mishap. To prevent individuals from abandoning safety in an effort to accomplish the mission:

1.2.1.1. Ensure all personnel know and use the six-step Operational Risk-Management process in all operations.

1.2.1.2. Establish a command climate from the outset that promotes safety. Begin by establishing a safety network, designating safety personnel.

1.2.1.3. Enforce standards; require all personnel to perform to standard in all operations.

1.2.2. Areas that impact the conduct of safe operations can be examined before deployment. These may include:

1.2.2.1. Billeting. Finalize arrangements before departure and ensure they provide for adequate crew rest.

1.2.2.2. Medical. Identify all medical facilities. Medical personnel should identify potable water sources, preferred food sources, and precautions to prevent local diseases. Ensure plans are made to provide personnel with required immunizations prior to mobility processing. Identify any medical personnel deploying with you and ensure you can locate them. Make sure a flight surgeon briefing is accomplished prior to departure.

1.2.2.3. Transportation. Ensure controls for flight line access and control of vehicles, rental cars, etc., are arranged before departure. Evaluate local driving rules, regulations, and road conditions to identify significant factors that may impact personnel or vehicles.

1.2.2.4. Off-Duty Hazards. Identify any local conditions, laws, hazards, driving conditions, etc., before departure.

1.2.2.5. Fire Protection. Maintenance should bring fire extinguishers for use on the flight line. **NOTE:** Ensure “Tent City” fire extinguishers and smoke detectors are not forgotten and are operational prior to departure from home station. Ensure fire fighting and rescue capabilities meet the criteria outlined in the War and Mobilization Plan, Volume 1, Annex S, Appendix 5.

1.2.2.6. Climate and Weather. Ensure deploying personnel are briefed regarding expected weather conditions, so they can plan accordingly. Make sure personnel are issued appropriate uniform clothing for the deployed climate and current weather conditions. Issue the proper protective gear, e.g., sunscreen, insect repellent.

1.2.2.7. Munitions Safety. Provide written procedures for all phases of munitions operations at the deployed location. Ensure site plans are available for the deployed location.

1.2.2.8. Flammables and Combustibles:

1.2.2.8.1. Emphasize the need for spill control. Remind personnel to remove contaminated soil from operational areas at once because there may be extreme fire and vapor hazards in hot, dry conditions.

1.2.2.8.2. Protect flammables (flashpoint less than 100 degrees Fahrenheit [F]) and combustibles (flashpoint 100 degrees F or greater) from extreme heat exposure.

Chapter 2

OPERATIONAL RISK MANAGEMENT (ORM)

2.1. Introduction to Operational Risk Management:

2.1.1. The ultimate objective of any organization within the Air Force is maximizing combat capability. Important elements in this objective are protecting our personnel and conserving combat weapon systems and their support equipment. Preventing mishaps and reducing losses is an important aspect of conserving these resources. ORM contributes to mishap prevention, and therefore to combat capability, by minimizing risks due to hazards consistent with other cost, schedule, and mission requirements. The fundamental goal of ORM is to enhance mission effectiveness at all levels while preserving assets and safeguarding health and welfare. Beyond reducing losses, ORM also provides a logical process to identify and exploit opportunities that provide the greatest return on our investment of time, dollars, and personnel.

2.1.2. As you accomplish the mission, you will manage the risk to your people and resources. You must analyze and anticipate as many hazards as possible before deployment. This pamphlet by itself is not a complete ORM program. It will highlight the most hazardous functional areas and give insight to hazards previously experienced during other contingency operations.

2.1.3. Risk is the potential for injury, damage, or loss and is present in everything we do. It is measured by several factors including the potential mishap severity, the probability of mishap occurrence, and mission impact. Hazards are conditions we face that have mishap potential. To manage risk, you must identify the potential hazards, then, take the necessary steps to minimize or eliminate the potential hazards using a Risk Assessment Code (RAC) priority system. Time may not allow elimination of all hazards, thus, the importance of priorities. An active risk assessment culture will help you and the deploying force alter the mishap possibilities. Situational awareness needs to be based on an accurate perception and include all probable options. A risk decision should reflect controls guaranteeing the minimum risk necessary for mission accomplishment.

2.1.3.1. All United States (US) Air Force missions and our daily routines involve risk. All operations, both on-and off-duty, require decisions that include risk assessment as well as ORM. Each commander and supervisor, along with every individual, is responsible for identifying potential risks and adjusting or compensating appropriately. Risk decisions must be made at a level of responsibility that corresponds to the degree of risk, taking into consideration the significance of the mission and the timeliness of the required decision. Risk should be identified using the same disciplined, organized, and logical thought-processes that govern all other aspects of military endeavors. The US Air Force aim is to increase mission success while reducing the risk to personnel and resources to the lowest practical level in both on- and off-duty environments.

2.1.3.2. ORM is an essential element of military doctrine. Uncertainty and risk are part of all military operations. A time-tested principle of success in the US Air Force and joint operations is taking bold, decisive action, and a willingness to identify and control or accept the associated risk. Risk is the probability and severity of failure or loss from exposure to various hazards. Carefully determining the hazards, analyzing and controlling the hazards, and executing a supervised plan that accounts for these hazards contributes to the success of the application of military force.

2.1.4. ORM is the process used by decision-makers to reduce or offset risk. The ORM process provides leaders and individuals a systematic mechanism to identify and choose the optimum course of action for any given situation. ORM must become a fully integrated element of planning and executing an operation. The ORM process is applicable to all levels of military operations from strategic to tactical. Commanders are responsible for the routine application of ORM in the planning and execution phases of all missions, whether they are combat or support operations.

2.1.4.1. ORM is a logic-based, common sense approach to making calculated decisions on human, material, and environmental factors before, during, and after Air Force mission activities and operations, i.e., on- and off-the-job. It enables commanders, functional managers, supervisors, and individuals to maximize operational capabilities while minimizing risks by applying a simple, systematic process appropriate for all personnel and Air Force functions. (Reference AFI 91-213, *Operational Risk Management (ORM) Program*.)

2.1.4.2. The use of ORM as part of the planning and execution phases of deployment can mean the difference in successful mission completion, or not. Using the ORM process for identifying and controlling hazards will help commanders reduce their risk during planning and execution of deployed operations. Controlling hazards protects the force from unnecessary risks. Eliminating unnecessary risks opens the way for audacity in execution and preserves combat power.

2.2. Planning:

2.2.1. Good ORM is crucial to operational readiness and safe mission accomplishment. We cannot afford to lose our scarce resources to poor judgment or faulty reasoning. All your available resources must be applied to mission accomplishment. You must integrate ORM into all operations to preserve resources and ensure all forces return safely home.

2.2.2. Our people and material are at greater risk while supporting contingencies—whether a natural disaster, base-wide exercise, or joint operations at a bare base. It is everyone's responsibility to minimize the hazards, but safety personnel should take a leading role in identifying methods, techniques, and procedures that are or could be effective in protecting personnel from controllable hazards.

2.2.3. In most contingency operations, you will have time to prepare your strategy. You should pull together a team of risk assessment specialists from the safety, fire, health services, and functional managers participating in the contingency. This team will help you understand the risks associated with deployed operations to allow you to make the safest possible decisions and achieve mission objectives.

2.2.4. Contingency and exercise manpower is often comprised of augmentees. Although they should be trained, they may lack proficiency in diverse mission scenarios.

2.3. Integrating ORM Into Contingency Operations:

2.3.1. During initial planning stages, perform risk analysis. Use knowledgeable personnel from safety, fire, health, environmental, and security agencies to help you identify and prepare for many contingency hazards. You should conduct pre-deployment surveys at both home installations and contingency sites to identify and ensure abatement of potential hazards before a full-scale deployment. In addition, during surveys you should inspect all facilities, flight line areas, and roadways that are to be used. Abatement of identified hazards should begin prior to initiation of actual deployment.

2.3.2. Implement a modified hazard reporting and hazard abatement program during contingencies. Ensure all personnel report hazards immediately to permit timely correction or mitigation.

2.3.3. Be alert that your people will want to deviate from established practices. This is only acceptable after all risks are considered and appropriate measures are implemented to reduce the risk to an acceptable level. Responsible decision-makers must weigh the risks and take appropriate measures to prevent unnecessary sacrifices of their people and equipment. The possibility of a language, cultural, or military service policy difference may exist due to multi-Department of Defense (DoD) components and foreign national involvement.

2.3.4. Establish positive communications within your organization, other services counterparts, and with the next higher echelon—you'll find it invaluable to good ORM. You'll find it more so during joint operations with other US services or with armed forces of other countries.

2.3.5. Bring personal protective equipment (PPE). You'll need it to respond to the normal demands. Your people may need to don their chemical gear, which is bulky and hot. Plus, the gas mask limits vision and the "bunny boots" make it hard to drive. Make sure your people understand the new environment and take extra care in performing their duties.

2.3.6. Watch for stress. All contingency operations have proven stressful and people under stress often make mistakes resulting in a mishap. Family separation and unfamiliar working and living environments all add stress. These factors are part of life and in small doses can be tolerable, but during contingency operations they may become insurmountable for some. Watch for signs:

2.3.6.1. Physical and mental fatigue.

2.3.6.2. Alcohol-related problems.

2.3.6.3. Health-related problems including multiple complaints of minor aches and pains and sickness.

2.3.6.4. Attempted suicides.

2.3.6.5. Irritability—people getting angry easily or being overly sensitive to any sort of feedback.

2.3.6.6. Withdrawal—people pulling inside themselves and not seeming to pay any attention to what you are saying.

2.3.6.7. Forgetfulness—short-term memory loss.

2.3.6.8. Projecting blame—when a person in essence says, “I only did it because you told me to do it, so it’s your fault.”

2.3.7. To reduce stress to an acceptable level:

2.3.7.1. Exercise (non-competitive).

2.3.7.2. Allow people time to walk away from something upsetting to get a new perspective upon return.

2.3.7.3. Encourage early, open discussion concerning operational problems within the supervisory chain; early detection and solution precludes larger problems later.

2.3.7.4. Encourage discussion regarding any problems.

2.3.7.5. Promote moderation in all that is done.

2.3.8. Know what off-duty activities your people are planning. Even on contingency operations, the majority of Air Force reportable mishaps occur off-duty. Traffic mishaps are the big killers—speed, lack of seat belt use, alcohol use, fatigue, and unfamiliar and (or) poorly marked roads. Also, visit living quarters frequently to ensure quality of life and safety issues are not ignored. Your people will work better knowing you are personally concerned. Work with services to make sure sports and recreation activities are available. Provide supervision of sporting activities.

2.4. The ORM Process. ORM is a six-step process:

2.4.1. Step 1—Identify the Hazards. Hazard can be defined as any real or potential condition that can cause mission degradation, injury, illness, or death to personnel, or damage to or loss of equipment or property. Factors to Consider When Identifying Hazards:

- 2.4.1.1. Time for mission preparation and execution;
- 2.4.1.2. Terrain (rough, hills, swamp, etc.);
- 2.4.1.3. Long hours and probability of fatigue;
- 2.4.1.4. Competition for time (training versus safety briefings);
- 2.4.1.5. Skill level of personnel;
- 2.4.1.6. Operational hazards;
- 2.4.1.7. Water hazards;
- 2.4.1.8. Road conditions (narrow, congested, curves, hills, etc.);
- 2.4.1.9. Communication requirements (between units, joint service);
- 2.4.1.10. Weather (existing and forecast);
- 2.4.1.11. Equipment condition (age, maintenance, etc.);
- 2.4.1.12. Cargo (type, quantity, security);
- 2.4.1.13. Hazardous material (fuel, ammo, etc.);
- 2.4.1.14. Enemy;
- 2.4.1.15. Critical mishap problem areas;
- 2.4.1.16. Transportation to and from the operational site;
- 2.4.1.17. Intensity of operations;
- 2.4.1.18. Physical fitness of personnel;
- 2.4.1.19. Personnel attitudes (poor or bad motivation);
- 2.4.1.20. Maintenance hazards;
- 2.4.1.21. Building conditions (fire hazards, integrity of structure, etc.);

2.4.1.22. Convoy route (sufficient room for rest areas);

2.4.1.23. Logistical support;

2.4.1.24. Animal, insect, or plant hazards;

2.4.1.25. Day versus night operations;

2.4.1.26. Speed limits;

2.4.1.27. Supervision (direct or indirect);

2.4.1.28. Individual Protective Equipment (IPE);

2.4.1.29. Work and rest cycles;

2.4.1.30. Unlighted walking paths;

2.4.1.31. No sidewalks;

2.4.1.32. Tent lines; or

2.4.1.33. Contracted equipment and (or) operators.

2.4.2. Step 2—Assess the Risk. Risk is the probability and severity of loss from exposure to the hazard. Assessment is the application of quantitative or qualitative measures to determine all the levels of risk associated with a specific hazard. The assessment step in the process defines the probability, severity, and exposure of a mishap that could result from the hazard.

2.4.3. Step 3—Analyze Risk Control Measures. Investigate specific strategies and controls that reduce or eliminate risk. Effective control measures reduce one of the three components (probability, severity, or exposure) of risk.

2.4.4. Step 4—Make Control Decisions. Decision makers at the appropriate level choose controls based on analysis of overall costs and benefits.

2.4.5. Step 5—Implement Risk Controls. Once control strategies have been analyzed, an implementation strategy needs to be developed and then applied by management and the work force. Implementation requires commitment of time and resources.

2.4.6. Step 6—Supervise and Review. ORM is a process that continues throughout the life cycle of the system, mission, or activity. Once controls are in place, the process must be scrutinized to determine its effectiveness.

2.5. The ORM Rules. This six-step process is governed by four rules:

2.5.1. Rule 1—Accept no Unnecessary Risk. Unnecessary risk comes without a commensurate return in terms of real benefits or available opportunities. All US Air Force missions and our daily routines involve risk. All activities require a basic understanding of hazards and risks as well as appropriate controls. The most logical choices for accomplishing a mission are those that meet all mission requirements while exposing personnel and resources to the lowest acceptable risk. ORM provides tools to determine which risk or what level of risk is unnecessary. The corollary to this axiom is “accept necessary risk” required to successfully complete the mission or task. As an example, choosing the lowest threat ingress to a target versus the most direct route avoids unnecessary risk.

2.5.2. Rule 2—Make Risk Decisions at the Appropriate Level. Making risk decisions at the appropriate level establish clear accountability. Those accountable for the success or failure of the mission must be included in the risk decision process. Anyone can make a risk decision; however, the appropriate level for risk decisions is the one that can allocate the resources to reduce the risk or eliminate the hazard and implement controls. Commanders at all levels must ensure subordinates know how much risk they can accept and when they must elevate the decision to a higher level. Typically, the commander, leader, or individual responsible for executing the mission or task is:

2.5.2.1. Authorized to accept levels of risk typical of the planned operation (i.e., loss of mission effectiveness, normal wear and tear on material).

2.5.2.2. Required to elevate decisions to the next level in the chain of command after it is determined that controls available to him or her will not reduce residual risk to an acceptable level.

2.5.3. Rule 3—Accept Risk When Benefits Outweigh the Costs. All identified benefits should be compared to all identified costs. The process of weighing risks against opportunities and benefits helps to maximize unit capability. Even high risk endeavors may be undertaken when there is clear knowledge that the sum of the benefits exceeds the sum of the costs. Balancing costs and benefits may be a subjective process and open to interpretation. Ultimately, the balance may have to be determined by the appropriate decision authority.

2.5.4. Rule 4—Integrate ORM into Air Force Doctrine and Planning at all Levels. To effectively apply ORM, commanders must dedicate time and resources to incorporate ORM principles into the planning processes. Risks are more easily assessed and managed in the planning stages of an operation. Integrating ORM into planning as early as possible provides the decision maker the greatest opportunity to apply ORM principles. Additionally, feedback must be provided to benefit future missions and activities.

2.6. ORM Responsibilities:

2.6.1. Commanders:

2.6.1.1. Are responsible for effective management of risk.

2.6.1.2. Select from risk reduction options provided by the staff.

2.6.1.3. Accept or reject risk based on the benefit to be derived.

2.6.1.4. Train and motivate leaders to use ORM.

2.6.1.5. If not authorized to accept high level risks, elevate to the appropriate level.

2.6.2. Staff:

2.6.2.1. Assess risks and develop risk reduction options.

2.6.2.2. Integrate risk controls into plans and orders.

2.6.2.3. Identify unnecessary risk controls.

2.6.3. Supervisors:

2.6.3.1. Apply the ORM process and direct personnel to use it both on- and off-duty.

2.6.3.2. Consistently apply effective ORM concepts and methods to operations and tasks.

2.6.3.3. Elevate risk issues beyond their control or authority to superiors for resolution.

2.6.4. Individuals:

2.6.4.1. Understand, accept, and implement ORM processes.

2.6.4.2. Maintain a constant awareness of the changing risks associated with the operation or task.

2.6.4.3. Make supervisors immediately aware of any unrealistic risk reduction measures or high risk procedures.

2.7. Risk Assessment. Combine the severity and probability estimates to form an assessment for each risk. The Operational Risk Assessment Matrix ([table 2.1.](#)) forms the basis for judging both the acceptability of a risk and the management level at which the decision on acceptability will be made.

Figure 2.1. Operational Risk Assessment Matrix.

			Probability									
			Frequent		Likely	Occasional		Seldom	Unlikely			
			A		B		C		D		E	
S E V E R I T Y	Catastrophic		I		Extremely High		High				Medium	
	Critical		II								Medium	
	Moderate		III		High		Medium				Low	
	Negligible		IV		Medium							
			Risk Levels									

2.8. Examples Of Control Measures For Hazards Involved In Deployment Operations:

2.8.1. Hazard—Inadequate Fire Protection:

2.8.1.1. Coordinate with local fire departments for coverage.

2.8.1.2. Optimize use of available extinguishers.

2.8.1.3. Ensure firefighters are aware of the types of hazardous materials being loaded so they can be prepared with the proper extinguishing equipment and materials.

2.8.2. Hazard—Material-Handling Equipment:

2.8.2.1. Identify and use trained and certified personnel.

2.8.2.2. Conduct training of additional operators for long-term operations.

2.8.3. Hazard—Lack of Proper Personal Protective Equipment (PPE):

2.8.3.1. Ensure gloves are provided during movement of equipment.

2.8.3.2. Obtain proper eye protection as required.

2.9. Pre-Deployment Considerations:

2.9.1. Review the deployment plan. Concept of operation, personnel, safety annex, and limiting factors (LIMFACS) are of primary importance.

2.9.2. Ensure an Operational Risk Analysis was accomplished and approved by the responsible commander for the deployment.

2.9.3. Confer with previous deployment safety officer and (or) non-commissioned officer (NCO) for updated information. This may require calling the safety office of the last unit deployed. If at all possible, call the person you are replacing while they are still at the deployed location.

2.9.4. Get visibly involved in pre-deployment planning to include personnel, maintenance, LIMFACS, required simulator training, aircrew currencies, etc. Determine other required safety personnel and get them involved in the planning process.

2.9.5. If explosives or missiles will be involved, ensure personnel who will handle them have received explosives or missiles safety training and are properly qualified. Major commands must ensure adequate explosives safety support is available at the deployment location during planning and beddown. The weapons representative could come from the service retaining overall safety responsibility at the joint location. Consider the differences in operations that may arise.

2.9.6. Examples of violations during loading and shipment include: failure to identify and mark containers; mixing Class A explosives with incompatible Class C ammunition; corrosives improperly certified and mixed with unidentified hazardous lubricants; meals ready to eat (MRE) and undocumented insecticides on the same pallet; improper storage; and improper security. To ensure proper loading and shipment, take the following actions:

2.9.6.1. Train load teams to standard;

2.9.6.2. Secure all equipment stowed inside vehicles so they do not move during rough port handling and high seas or rough air turbulence;

2.9.6.3. Comply with Air Force Instructions in airlift of hazardous material and with guidelines;

2.9.6.4. Ensure vehicles have required tiedown shackles;

2.9.6.5. Keep personnel out from under equipment being lifted aboard ship;

2.9.6.6. Coordinate and understand requirements for “topping off” vehicles prior to shipment;

2.9.6.7. Coordinate port of embarkation shipping requirements for bulk fuel or Petroleum, Oils, and Lubricants (POL) tank transporters; and

2.9.6.8. Ensure vehicle master switches are turned off immediately after loading.

2.9.7. Request the following information or consider:

2.9.7.1. Medical facilities available;

2.9.7.2. Airfield familiarization training to include: runway, ramp, over-run condition, and foreign object damage (FOD) potential;

2.9.7.3. Hung and hot ordnance and (or) hot cargo areas and procedures;

2.9.7.4. Combat Aircraft Parking Area (CAPA);

2.9.7.5. Airfield lighting;

2.9.7.6. Air traffic control and radar approach control (RAPCON) procedures and language limitations;

2.9.7.7. Birdstrike potential;

2.9.7.8. Midair collision potential;

2.9.7.9. Alternate airfields and procedures;

2.9.7.10. Helicopter and rescue support;

2.9.7.11. Tower and supervisor of flame (SOF) capabilities and procedures;

2.9.7.12. Local obstructions;

2.9.7.13. Identified on- and off-base safety threats to personnel;

2.9.7.14. Housing and working facilities;

2.9.7.15. Ground transportation plan, schedule, and vehicle support;

2.9.7.16. Availability of portable radios;

2.9.7.17. Importance of adequate rest;

2.9.7.18. Key personnel and agency listing;

2.9.7.19. Message center and command post capabilities to include use of address indicator groups (AIG);

2.9.7.20. Local operating instructions and directives to include munitions restriction listing;

- 2.9.7.21. Designated explosive routes;
 - 2.9.7.22. Emergency response capabilities and LIMFACS;
 - 2.9.7.23. Climatology and required flight gear and work clothing;
 - 2.9.7.24. Barriers, cables (tape, configuration, rig time);
 - 2.9.7.25. Hydrazine response areas and procedures (if applicable);
 - 2.9.7.26. Ejection and jettison areas;
 - 2.9.7.27. Sufficiency of aircraft fire fighting and rescue response capabilities; and
 - 2.9.7.28. Hazardous materials storage and incident response capabilities.
- 2.9.8. Disseminate mishap prevention material to the unit prior to the deployment. This material should include “Lessons Learned” from mishap reports and other deployments.
- 2.9.9. Prepare a deployment safety kit. It should contain the following or they must be readily available at the deployed location. Add your own requirements.
- 2.9.9.1. AFI 91-202, *The US Air Force Mishap Prevention Program*.
 - 2.9.9.2. AFI 91-204, *Safety Investigations and Reports*.
 - 2.9.9.3. AFI 91-207, *The US Air Force Traffic Safety Program*.
 - 2.9.9.4. AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*.
 - 2.9.9.5. AFI 91-302, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Standards*.
 - 2.9.9.6. Air Force Manual (AFMAN) 91-201, *Explosives Safety Standards*.
 - 2.9.9.7. TO 11A-1-46, *Fire Fighting Guidance, Transportation, and Storage*.
 - 2.9.9.8. TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*.
 - 2.9.9.9. Point of contact (POC) listing.
 - 2.9.9.10. Calculator.
 - 2.9.9.11. Protractor, compass, pencils, note paper, markers, and earplugs.

- 2.9.9.12. AF Form 943, **Explosives Safety Site Plan**, and continuation sheets.
- 2.9.9.13. Metric scale 1:5,000 and stand scaled rulers.
- 2.9.9.14. Measuring wheel and equipment.
- 2.9.9.15. Radios, beepers, scanners, etc.
- 2.9.9.16. SARA LITE Message Disks.
- 2.9.9.17. AF Form 457, **USAF Hazard Report**.
- 2.9.9.18. Bird aircraft strike hazard (BASH) worksheets.
- 2.9.9.19. Mishap Response Plan.
- 2.9.9.20. Camera and film, if deployed photo support is unavailable.
- 2.9.9.21. Cassette recorder, tapes, and batteries.
- 2.9.9.22. Tape measure.
- 2.9.10. Coordinate with deployment navigation planning personnel for deployment and redeployment routing and ensure aircrews have:
 - 2.9.10.1. All necessary flight plans and charts.
 - 2.9.10.2. Refueling and Divert Data.
 - 2.9.10.3. Terminal area arrival procedures data.
 - 2.9.10.4. Destination local area maps.
- 2.9.11. Brief the deployment commander on your preparations and requirements which have been met.
- 2.9.12. Ensure the following pre-deployment contingency and wartime deployment with live munitions procedures are considered. **NOTE:** Pre-deployment explosives safety site planning is not intended to duplicate existing explosives safety plans, but is to ensure proper planning and coordination between deploying and host or support units to safely beddown and employ combat forces.
 - 2.9.12.1. Are procedures information provided by the host unit to include:

2.9.12.1.1. A current and future base explosives location map?

2.9.12.1.2. A copy of all applicable joint-use and sole-use facilities with Net Explosives Weight (NEW) limits and other special provisions?

2.9.12.1.3. Climatic conditions?

2.9.12.1.4. Local regulations that may affect the deployed unit's operations?

2.9.12.1.5. Aerial photos, if available?

2.9.12.2. Have you reviewed your OPLAN requirements?

2.9.12.3. Did weapons and flight safety personnel participate in pre-deployment site surveys?

2.9.12.4. Did you coordinate with host or support unit to ensure facilities and locations are designated for storage, buildup, and munitions loading operations?

2.9.12.5. Do plans address pertinent explosives safety information of all explosives operations and locations required for the contingency tasking?

2.9.12.6. Have you reviewed any "Lessons Learned" and are you taking a copy to the deployed location?

2.10. Initial Arrival Duties:

2.10.1. Check the following:

2.10.1.1. Adequacy of aircraft parking plan;

2.10.1.2. Flight line driving plan to include arrows for direction of travel for vehicles and aircraft;

2.10.1.3. Proper distance between aircraft; and

2.10.1.4. Taxi lines.

2.10.2. Contact host agencies, (if applicable), such as safety, fire department, base operations, weather, air traffic control, and command post.

2.10.3. Ensure deployed personnel know how to contact the deployed commander's safety representative (location, phone number, and (or) radio call-sign).

Chapter 3

SITE PREPARATION

3.1. Theater of Operations Site Preparation. Site preparation in a Theater of Operation consists of providing a secured ground surface to support the mission base operations. Take the following actions, if appropriate:

- 3.1.1. Clear trees.
- 3.1.2. Grub and strip.
- 3.1.3. Grade and drain.
- 3.1.4. Repair existing roads or construct new.
- 3.1.5. Repair existing runways or construct new.
- 3.1.6. Secure the base against intrusion.
- 3.1.7. Identify possible minefields.

3.2. Operational Risk Assessment. An Operational Risk Assessment is imperative. Initial construction would consist of accomplishment of the minimum requirements to establish an operational base such that additional material, supplies, equipment, and personnel could be flown in. Most of this construction would be accomplished utilizing existing facilities and equipment, locally available material, and a lot of ingenuity and back-breaking work. Because of the nature of the work and the restricted time limits, the hazards that can be identified are limitless.

3.3. Electrical Services in a Theater of Operations. Electrical Services should provide electricity for the operation of critical airfield lighting and communications systems first, and personnel operations and support services secondly. During the initial period, standard military mobile generators will supply most critical electric power. Where local electric power generation and distribution facilities are available, they may be used as a primary source of power; however, provisions must be made to provide back-up power for critical mission systems. All critical systems must be provided with back-up systems such that the loss of a single source of power will not endanger the operation of the facility. The placement of mobile generators would be in a dispersed fashion, and each position should be protected by revetments and camouflage.

- 3.3.1. Advance planning and provisions for alternate systems such as fires, use of vehicle lighting, and driving generators from other motor sources are all a part of the mission of the initially deployed forces and fall in the category of expedient construction.
- 3.3.2. Trained technicians must accomplish the design, operation, and maintenance of electrical systems. Untrained personnel should never work with an energized system.

3.3.3. Proper grounding of an electrical system is essential to the safe operation of the system and will be accomplished by a qualified electrical technician. Grounding is accomplished by driving ground rods into the ground and providing a minimum 10 American Wire Gauge (AWG) bare copper wire from the ground rod to the device or system to be grounded. The spacing and depth of ground rods depends upon the resistance to ground to the earth at the site. In the absence of the capability to measure the resistance to ground and determine actual grounding requirements for the site, use a three-fourths inch diameter pipe or equivalent solid rod driven 10 feet deep or into the permanent ground water level, if known. Electrical continuity is essential in a grounding system; therefore, all connections should be clean and permanently bonded.

3.3.4. The design and application of grounding to an electrical system should be inherent in the system installation and not something that can be added at a later date. As previously discussed, electrical system trained technicians must accomplish design and installation. There are, however, two types of grounding systems not generally associated with the electrical system, which are necessary for the safe operation of an air base. These systems are lightning and static electricity protection.

3.3.4.1. Although not a primary consideration for initial construction, lightning protection should be considered for protection of essential facilities and buildings. (Refer to the Weapons Safety Manager for interpretation of AFMAN 91-201). Essential or high-risk facilities or buildings include fuel storage areas and ammunition or explosive materials storage or handling. Protection can be accomplished by providing grounded air terminals along high points and the perimeter of buildings or a series of high towers located beyond a given area to be protected. The essential feature of a lightning protection system is that air terminals, conductors, and ground rods be large enough to provide a path of least resistance to ground for a given area.

3.3.4.2. Static electricity protection is a primary consideration whenever there is a potential of static electricity build-up and a discharge or sparking could injure personnel or cause ignition of explosive materials. Static grounding is essential for portable, normally ungrounded motor-driven equipment. Primary considerations include POL facilities, weapons systems, communications facilities, and airplane parking and maintenance facilities.

3.4. Airfield Nighttime Operations. Where operation of the airfield at night is necessary, or a possibility, provisions for alternate lighting systems must be provided for in advance. Alternate lighting systems consist of prepositioned materials and equipment for smudge pots and fires. This alternate lighting can be used in the absence or failure of electrically powered systems.

3.5. Water Sources. Water sources should be 75 feet upstream of brine discharge from water purification equipment. Distribution cables can be placed in trenches along with water and sanitary pipelines to save time and labor (when time allows, separate water and sewage trenches by 10 feet). To reduce personnel exposure to electrical hazards it is highly advisable to place a bare copper conductor in the trench alongside the cables. This conductor must be bare and must be

solidly attached to the generator ground terminal, and to the frames of all connected electrical equipment. The size of the bare conductor should be close to the size of the largest insulated conductor in the trench.

3.6. Combat Construction:

3.6.1. Equipment Operation:

3.6.1.1. Remind operators that construction equipment may be very unstable off road in sandy and rocky terrain.

3.6.1.2. Ensure operators and supervisors check outriggers for stability. This is especially critical in sand or soil where a surface crust exists.

3.6.1.3. Ensure safety belts are worn at all times when operating equipment.

3.6.1.4. Ensure rollover protection systems are installed and erect sun umbrellas on slow-speed equipment such as rollers and compactors.

3.6.1.5. Establish operator and crew equipment-rollover drills.

3.6.1.6. Ensure ground guides are used at construction sites and in congested areas and tent locations.

3.6.1.7. Rehearse braking and downhill-driving procedures with all operators.

3.6.2. Construction Sites:

3.6.2.1. Appoint a site safety supervisor for large earthwork or building construction sites.

3.6.2.2. Ensure helmets or hard-hats are worn at construction sites.

3.6.2.3. Control vehicle, pedestrian, and troop access to sites.

3.6.2.4. When excavating, ensure excavation walls are reinforced to prevent cave-ins.

3.6.2.5. Ensure all personnel on the site know what to do in case of flash floods (refer to paragraph 5.1.).

3.6.2.6. Ensure all electrical equipment is grounded and ground and bond when transferring fuel.

3.6.2.7. Ensure safety equipment (goggles, gloves, welding masks, aprons, dust respirators, etc.) is available and used.

3.6.2.8. Ensure personnel do not shortcut safety procedures due to heat discomfort.

3.6.2.9. Ensure personnel know precautions to take during a windstorm to prevent injury and equipment damage (refer to paragraph 4.3.).

3.6.2.10. Determine if site has windstorms and ensure this hazard is taken into account during both design and construction.

3.6.2.11. Establish policies and procedures for recovery of equipment in sand.

3.6.2.12. Protect electrical wiring, hydraulics, and optics from abrasive effects of blowing sand, snow, rain, etc.

3.6.2.13. Protect hydraulics, fuel, and optics from sand, dust, or water contamination.

Chapter 4

WEATHER CONDITIONS

4.1. Adverse Weather Conditions. Deployed weather personnel or the base weather station (BWS) is responsible for making the initial notification to pre-determined support agencies of adverse weather conditions. Adverse weather conditions include: strong surface winds, heavy rain, freezing precipitation, and thunderstorms (i.e., frequent dangerous lightning, damaging winds, and hail).

4.2. General Lightning Safety for All AF Activities and Operations:

4.2.1. When lightning is detected or observed within the immediate vicinity of any activity or operation, do not go out of doors or remain out unless it is absolutely necessary. Remember—lightning may strike some miles from the parent cloud. Precautions should be taken even though the thunderstorm is not directly overhead. If you are caught outside:

4.2.1.1. Do not stand underneath a tall isolated tree or a telephone pole.

4.2.1.2. Avoid projecting above the surrounding landscape. For example: don't stand on a hilltop.

4.2.1.3. In a forest, seek shelter under a thick growth of small trees.

4.2.1.4. In open areas, go to a low place, such as a ravine or valley.

4.2.1.5. Get off or away from open water, metal equipment, or small metal vehicles.

4.2.1.6. Stay away from wire fences, metal pipes, and rails.

4.2.1.7. If you in a group in the open, spread out, keeping people several yards apart.

4.2.1.8. If you are caught in a level field or prairie far from shelter and you feel your hair stand on end, lightning may be about to strike you. Drop to your knees and bend forward, putting your hands on your knees. **DO NOT LIE FLAT ON THE GROUND.**

4.2.2. Seek shelter as follows:

4.2.2.1. Dwellings or other buildings that are protected against lightning;

4.2.2.2. Protected underground shelters;

4.2.2.3. Large metal-framed buildings;

- 4.2.2.4. Enclosed automobiles, buses, aircraft, and other vehicles with metal tops and bodies;
- 4.2.2.5. Streets that may be shielded by nearby buildings.
- 4.2.3. Certain locations are extremely hazardous during thunderstorms and should be avoided:
 - 4.2.3.1. Hilltops and ridges;
 - 4.2.3.2. Areas on top of buildings;
 - 4.2.3.3. Under isolated trees;
 - 4.2.3.4. Near electrical appliances, telephones, plumbing fixtures, and metal or electrically conductive objects; and
 - 4.2.3.5. Aircraft dry bays, tanks, and wheel wells.
- 4.2.4. Each Deployment Commander will ensure a local procedure is developed to advise key personnel and notify agencies involved in high weather risk activities and operations. Normally, these agencies are those having aircraft, POL facilities, open air work and recreational activities, and underground utilities work. Key personnel, in turn, will advise all on-duty supervisors to take proper precautions and timely actions.
- 4.2.5. Each location will have a lightning safety program with a two-tier notification system to minimize personnel exposure to lightning hazards.
 - 4.2.5.1. A *Lightning Watch* is in effect 30 minutes prior to thunderstorms being within a 5-nautical mile (nm) radius of any pre-determined location or activity as forecast by the BWS or deployed weather personnel. **NOTE:** Lightning is a direct product of a thunderstorm. During a Lightning Watch, accomplish the following:
 - 4.2.5.1.1. Continue operations or activities; however, ensure all personnel are prepared to implement Lightning Warning procedures without delay.
 - 4.2.5.1.2. Be alert for any lightning activity, to include audible thunder, and advise supervisory personnel of any observations.
 - 4.2.5.2. A *Lighting Warning* is in effect whenever any lightning is occurring within a 5-nm radius of the pre-determined locations and activities. Personnel in affected locations or engaged in affected activities will take the following actions:
 - 4.2.5.2.1. Cease all outside activities and seek shelter.

4.2.5.2.2. Recommended locations that provide safe shelter and locations to avoid are listed in [paragraphs 4.2.2. and 4.2.3.](#)

4.2.5.3. If lightning does not occur within a 5-nm radius at the valid (forecast) time of the Lightning Watch, BWS or deployed weather personnel will reassess the Lightning Watch and amend as needed. Lightning Warnings will be canceled when the thunderstorms have passed beyond the 5-nm radius of the location or activity. A Lightning Watch will NOT be canceled if there is potential for more thunderstorms within 30 minutes.

4.2.5.4. All aircraft fuel servicing and maintenance activities (including Liquid Oxygen [LOX] servicing) will cease whenever a Lightning Warning is in effect. **EXCEPTIONS:** Vehicle movements (including refuelers) and pipeline transfers (including bulk storage to hydrant tanks). (Refer to AFI 23-201, *Fuels Management*.)

4.3. Safeguarding Aircraft During High Winds. Serious structural damage to aircraft can be caused by high velocity surface winds. When possible, aircraft will be evacuated to safe weather areas when tornadoes, hurricanes, or unusually high winds are predicted. Locally established high wind safety precautions or plans will be developed and observed along with the guidance presented below:

4.3.1. Taxiing Aircraft. Taxiing aircraft during unusually high winds will be avoided. They may be taxied at the discretion of the deployment commander when the action will lessen the possibility of aircraft damage.

4.3.2. Outside Parking. If possible, light aircraft will be parked inside hangars. Those parked outside will be faced into the wind and tied down. Wing spoilers will be used to reduce airfoil lift. Transient aircraft will be tied down as directed by the aircraft commander.

4.3.3. Extremely High Winds. When wind velocity exceeds 30 knots (sustained or gusts), light aircraft in temporary docks or extending outside the hangars will be towed clear and parked in compliance with applicable aircraft TOs. When wind velocity exceeds 50 knots (sustained or gusts), medium or heavy aircraft in temporary docks or extending outside the hangars will be towed clear and then parked in compliance with applicable aircraft TOs.

4.3.4. Work Materials. All maintenance equipment, workstands, loose aircraft parts, and materials not in use will be removed from the parking area and stored in a safe area. Equipment remaining outside will be secured against wind movement.

4.3.5. Personnel. When winds reach hazardous velocities, activities other than those required to safeguard the aircraft will be avoided. Guidance for actions involving electrical storms is found in [paragraph 4.2.](#)

4.4. Cold Weather-Related Injuries:

4.4.1. Chilblain:

4.4.1.1. Definition. A nonfreezing cold injury which, while painful, causes little or no permanent impairment.

4.4.1.2. Symptoms. Appears as red, swollen skin which is tender, hot to the touch, and may itch. This can worsen to an aching, prickly (“pins and needles”) sensation, and then numbness. It can develop in only a few hours in skin exposed to cold.

4.4.1.3. First Aid:

4.4.1.3.1. Prevent further exposure; remove wet, constrictive clothing; and wash and dry the injury gently.

4.4.1.3.2. Elevate, cover the injury with layers of loose, warm clothing, and allow to rewarm (pain and blisters may develop). DO NOT pop blisters, apply lotions or creams, massage, expose to extreme heat, or allow victim to walk on injury.

4.4.1.3.3. Seek medical treatment.

4.4.1.4. Prevention. Refer to [paragraph 4.4.4](#).

4.4.2. Frostbite:

4.4.2.1. Definition. Frostbite is a severe reaction to cold exposure that can permanently damage its victims. The combination of wind and cold temperatures attacking less than adequately protected skin is the main cause of frostbite. When skin is exposed to the cold, blood vessels in the skin clamp down or constrict. As a result of a decreased blood flow to the skin, the fluid in and around skin cells develops ice crystals, which causes frostbite to occur. The areas most likely to get frostbitten are cheeks, ears, noses, fingers, feet, and toes. The extent of injury caused by exposure depends on wind velocity, duration and type of exposure, temperature, and humidity. Wind chill (a calculation of the adjusted temperature because of air temperature and wind speed) can help determine the possibility of frostbite ([see table 4.1](#)).

4.4.2.2. Symptoms. Just before frostbite occurs, the affected skin may be slightly flushed. As frostbite develops, the skin appearance changes to white or grayish-yellow. Pain is sometimes felt early but subsides later (often no pain is felt). The affected area feels intensely cold and numb. The victim frequently is not aware of frostbite until someone points out the change in skin color or the victim sees the skin changes and feels the pain of frostbite once inside, away from cold exposure.

Table 4.1. Wind-Chill Chart.

WIND SPEED	COOLING POWER OF WIND EXPRESSED AS “EQUIVALENT CHILL TEMPERATURE”																	
MPH	TEMPERATURE (DEGREES FAHRENHEIT)																	
CALM	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	
EQUIVALENT CHILL TEMPERATURE																		
5	35	30	25	20	15	10	5	0	-0	-10	-15	-20	-25	-30	-35	-40	-45	
10	30	20	15	10	5	0	-10	-15-	-20-	-25-	-35-	-40	-45	-50	-60	-65	-70	
15	25	15	10	0	-5	-10	-20	-25	-30	-40	-45-	-50	-60	-65-	-70	-80	-85	
20	20	10	5	0	-10	-15	-25-	-30-	-35	-45	-50	-60	-65	-75	-80	-85-	-95	
25	15	10	0	-5	-15-	-20	-30	-35	-45	-50	-60	-65	-75	-80	-90	-95	-105	
30	10	5	0	-10	-20	-25	-30	-40	-50	-55	-65	-70	-80	-85	-95	-100	-110	
35	10	5	-5	-10	-20	-30	-35	-40	-50	-60	-65	-75	-80	-90	-100	-105	-115	
40	10	0	-5	-15	-20	-30	-35	-45	-55	-60	-70	-75	-85	-95	-100	-110	-115	
WINDS ABOVE 40 HAVE LITTLE ADDITI- ONAL EFFECT	LITTLE DANGER (Normal Numbers)					INCREASING DANGER FLESH MAY FREEZE WITHIN 1 MINUTE (Bolded Numbers)						GREAT DANGER FLESH MAY FREEZE WITHIN 30 SECONDS (Italic Numbers)						

4.4.2.3. First Aid:

4.4.2.3.1. Get out of the cold, if at all possible and remove wet or frozen clothing or anything that constricts the frostbitten area. Warm hands by tucking them into your armpits; warm nose, ears, and face by covering it with dry, gloved hands. **DO NOT RUB OR MASSAGE THE AFFECTED AREA OR SOAK IT IN COLD WATER. ALSO, DO NOT RUB IT WITH ICE OR SNOW.**

4.4.2.3.2. If warm water is available, soak the affected area in water which is warm—not hot. An alternative is to begin warming by wrapping the affected area in a warm blanket.

4.4.2.3.3. Do not give a frostbite victim something with caffeine (like coffee, tea, or chocolate) or alcohol in it. Caffeine, a stimulant, can cause the heart to beat faster and hasten the effects the cold has on the body. Alcohol, a depressant, can slow the heart and also hasten the ill effects of cold body temperatures.

4.4.2.3.4. Check the skin every 10 to 20 minutes for signs of frostbite. Change wet clothing immediately.

4.4.2.3.5. Seek immediate medical assistance.

4.4.2.3.6. Protect previously frostbitten areas, as it remains vulnerable to thermal injury, in less time.

4.4.2.4. Prevention. Refer to [paragraph 4.4.4.](#)

4.4.3. Hypothermia:

4.4.3.1. Definition:

4.4.3.1.1. A condition brought on when the body cannot produce heat as fast as it is being lost. Hypothermia is a life-threatening condition in which deep-body temperature falls below 95 degrees F. Many people do not understand how dangerous hypothermia is or how fast it can set in. When your body starts losing heat faster than it can produce it, exposure has started. If exposure continues long enough, it leads to hypothermia.

4.4.3.1.2. Wet skin and wind accelerate body heat loss and the body produces less heat during inactive periods. Body temperature can fall even when air temperatures are above freezing, if conditions are windy, clothing is wet, and (or) the individual is inactive.

4.4.3.1.3. Victims normally do not notice the signs of hypothermia in themselves. Therefore, it's up to other members to be alert for the symptoms listed in paragraph 4.4.3.2. Even mild hypothermia can cause victims to make poor decisions or act drunk (removing clothing when it is clearly inappropriate, trying to start a fire in the rain, etc.).

4.4.3.2. Symptoms. Include puffy face, uncontrollable shivering, mental confusion and slow or slurred speech, memory lapses, incoherence, frequent stumbling, slow breathing, slow heart, drowsiness, exhaustion, withdrawn or bizarre behavior, irritability, and stomach cold to touch.

4.4.3.3. First Aid. A person showing these symptoms needs immediate treatment. If a person is alert and shivering, they probably are only suffering from mild hypothermia. They may deny there is a problem, but someone needs to take control and do the following (**NOTE:** If shivering has stopped, or the person is unconscious, severe hypothermia is probably present and the person requires immediate emergency medical intervention):

4.4.3.3.1. Prevent further exposure (wind, rain, or cold);

4.4.3.3.2. Remove wet clothing and put on warm dry clothes;

4.4.3.3.3. Give them warm drinks such soup (only if they are conscious). Avoid liquids with caffeine. **DO NOT** give them alcoholic drinks.

4.4.3.3.4. Rewarm them by covering with blankets, sleeping bags, and by body-to-body contact (also stripped of clothing);

4.4.3.3.5. Do not let the victim sleep;

4.4.3.3.6. Initiate Cardiopulmonary Resuscitation (CPR), **ONLY IF REQUIRED**. Sometimes the heart beat and breathing of hypothermia victims is so faint it can go

undetected and also they may have no response to touch or pain—when in fact they are still alive. Handle gently during treatment and evacuation, because rough handling can cause life-threatening disruptions in heart rate.

4.4.3.3.7. Get medical attention as soon as possible.

4.4.3.4. Prevention. Refer to [paragraph 4.4.4.](#)

4.4.4. Prevention of Cold-Related Injuries. Following are suggestions of ways to prevent cold-related injuries (chilblain, frostbite, and hypothermia):

4.4.4.1. If possible, limit the duration of exposure to extreme cold.

4.4.4.2. Always wear proper protective clothing, extra pair of socks, warm boots, and wind- and water-repellent material. Wear mittens instead of gloves and wool or insulated type socks. Wear head and face covering to retain heat (as much as 70 percent or more of the body's heat can be lost through radiation and convection from an uncovered head).

4.4.4.3. Wear several layers of clothing, rather than one or two “bulky” layers. Air is trapped between these layers and acts as insulation against the cold. Clothing filled with wool, down, and synthetic foams may be of assistance in retaining body heat.

4.4.4.4. Get plenty of rest because the danger of frostbite is increased if you are tired or have had a recent cold (body resistance is lowered).

4.4.4.5. Drink warm liquids like soup.

4.4.4.6. Eat nutritious, high-energy foods. Eat at least one hot meal a day. Exercise regularly to stimulate heat production in your muscles.

4.4.4.7. Avoid:

4.4.4.7.1. Caffeine and tobacco use, as these leave the skin more prone to thermal injury (caffeine may contribute to heat loss and smoking slows down blood circulation to the extremities).

4.4.4.7.2. Taking medication (some combinations of drugs can lower the body's resistance to the cold). Seek medical advice when taking medication.

4.4.4.7.3. Alcohol use, because it increases heat loss and distorts the senses, including the sense of how much time has been spent in the cold. Drinking alcohol lowers the body's temperature and dulls awareness to the cold. The person consuming the alcohol may perceive they are warmer, while in reality they may be contributing to greater cold injury.

4.4.4.7.4. Wet clothing, shoes, or socks, as they may further contribute to loss of body heat. Try to change wet footwear and clothing as soon as practically possible.

4.5. Cold Weather-Related Personal Protection. All too often we focus on *recognizing* and *treating* cold-weather injuries rather than *preventing* them. Consequently, the first-line supervisor will ensure the following actions are taken to prevent cold-related injuries:

4.5.1. Check each worker for proper dress (gloves, head protection, loose, layered clothing).

4.5.2. Ensure workers properly remove layers of clothing as the temperature changes.

4.5.3. Never allow a worker to unnecessarily wear wet clothing.

4.5.4. Require workers to change socks regularly.

4.5.5. Identify and closely monitor personnel who have previously suffered a cold-weather injury, as they are more susceptible.

4.5.6. Ensure proper hygiene is practiced.

4.5.7. Do not allow personnel to sleep in confined areas with vehicle-engines running.

4.5.8. Brief personnel on the symptoms of carbon-monoxide poisoning.

4.5.9. Ensure people are aware of hypothermia hazards. (Refer to paragraph 4.4.3. for symptoms and treatment).

4.5.10. Make sure people know that alcohol gives a “sensation” of warmth, but it increases loss of body heat.

4.5.11. When possible, keep the duration of to cold to a minimum consistent with mission accomplishment.

4.5.12. Ensure that people know exposure to freezing temperatures with foot perspiration may cause frostbite.

4.5.13. Require that people wear footwear with good gripping soles for wet, snowy, or icy surfaces.

4.5.14. Brief personnel about cold or hot soaked tool injuries.

4.5.15. Make sure personnel are aware of snow blindness hazards.

4.5.16. Make sure provisions are in place to warn personnel of any violent weather.

4.5.17. Encourage use of the “buddy system” to help detect signs of illness in others.

4.6. Hot Weather-Related Injuries. As environmental temperatures approach normal skin temperature, cooling of the body becomes more difficult. These conditions adversely affect an individual’s ability to work in the hot environment, especially when conditions of high humidity exist. When blood is being brought to the body surface to be cooled, less blood goes to the active muscles, the brain, and other internal organs. As a result, strength declines, fatigue occurs sooner than it would otherwise, and alertness and mental capacity may be affected. Workers who must perform delicate or detailed work may find their accuracy suffering, and others may find their comprehension and retention of information are lowered. As a result, certain safety problems are common to hot environments—slipperiness of sweaty palms, dizziness, or the fogging of safety glasses. If there are hot metal surfaces or steam, the possibility of burns also exists. Increased body temperature and physical discomfort promote irritability, anger, and other emotional states which sometimes cause workers to overlook safety procedures or to divert attention from hazardous tasks. Excessive exposure to a hot work environment can bring about a variety of heat-induced disorders. Examples are:

4.6.1. Heat Stress. The human body is comfortable at about 75 degrees F with 45 percent relative humidity. Comfort is determined by the amount of activity, the relative humidity, and the amount of air movement—all variables that affect the rate at which the body loses heat. The level of activity (work load), age, weight, disease status, alcohol intake, medication use, water and salt balance, and physical fitness all play a role in the human body’s response to heat stress. It takes 1 to 2 weeks for a person’s body to adjust to a region’s humidity and extreme heat (see paragraph 4.6.1.4.). The following heat index chart (table 4-2) shows what it “feels like” and at what temperatures heat stress can occur. **NOTE:** Exposure to full sunshine can increase these considerably.

4.6.1.1. Excess heat can place abnormal stress on the body. Temperature, humidity, radiant heat, and air velocity affect the amount of heat stress faced.

4.6.1.2. Exposure to heat can be intensified by age, weight, fitness, medical condition, and acclimatization to the heat.

4.6.1.3. The body reacts to heat by circulating blood and raising the skin’s temperature. The excess heat is then released through the skin. Physical activity can limit the amount of blood that flows to the skin to release heat.

4.6.1.4. Sweating can also maintain a stable body temperature if the humidity level is low enough to permit evaporation and if the fluids and salts lost are adequately replaced. An individual who is heat acclimated may perspire almost twice as much as an unacclimatized individual. One of the effects of acclimatization is to allow an individual to begin perspiration earlier in the course of exercise; this allows for a quick, effective, and efficient beginning to heat dissipation and alleviation of early heat buildup. As noted, the environment has a major impact on heat loss. Humidity, playing the largest role, but

temperature, of course, is also a major factor. The worst possible conditions would be a hot, humid, windless day, following a cool spell.

4.6.1.5. When the body cannot release heat, it stores it. This raises the core temperature and heart rate putting health at risk.

Table 4-2. How Bad Does It Feel—The Heat Index.

Environmental Temperature—Fahrenheit											
Relative Humidity	70	75	80	85	90	95	100	105	110	115	120
0 Percent	64	69	73	78	83	87	91	95	99	103	107
10 Percent	65	70	75	80	85	90	95	100	105	111	116
20 Percent	66	72	77	82	87	93	99	105	112	120	130
30 Percent	67	73	78	84	90	96	104	113	123	135	148
40 Percent	68	74	79	86	93	101	110	123	137	151	
50 Percent	69	75	81	88	96	107	120	135	150		
60 Percent	70	76	82	90	100	114	132	149			
70 Percent	70	77	85	93	106	124	144				
80 Percent	71	78	86	97	113	136					
90 Percent	71	79	88	102	122						
100 Percent	72	80	91	108							
At an apparent temperature of:											
90-104		Heat cramps or heat exhaustion possible									
105-130		Heat cramps or heat exhaustion likely, heatstroke possible									
130-more		Heatstroke highly likely.									

4.6.2. Heat Cramps:

4.6.2.1. Definition. Heat cramps usually affect people who sweat a lot during strenuous activity, which depletes the body's salt and moisture. The low salt level in the muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

4.6.2.2. Symptoms. Heat cramps are muscle pains or spasms—usually in the abdomen, arms, or legs—that may occur in association with strenuous activity.

4.6.2.3. First Aid:

4.6.2.3.1. If an individual has heart problems or is on a low sodium diet, get medical attention.

4.6.2.3.2. Stop all activity and sit quietly in a cool place.

4.6.2.3.3. Drink clear juice or a sports beverage.

4.6.2.3.4. Do not return to strenuous activity for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.

4.6.2.3.5. Seek medical attention if cramps do not subside in 1 hour.

4.6.3. Heat Exhaustion:

4.6.3.1. Definition. Heat exhaustion is the body's response to an excessive loss of the water and salt contained in sweat, resulting in dehydration. Those most prone to heat exhaustion are people with high blood pressure and people working or exercising in a hot environment to which they are unaccustomed or unacclimatized. When the rise in skin temperature results in sweating, bodies unaccustomed to heat will often be inefficient at sweat production, producing little and excessively salty sweat. Inefficient sweating and inadequate fluid replacement can lead to a loss of necessary fluids and salt.

4.6.3.2. Warning Signs of Heat Exhaustion. The victim may experience heavy sweating, headache, and muscle cramps and may become pale; irritable, confused, tired, dizzy; and nauseous. The skin will be and moist and clammy, but the body temperature will remain near normal. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated it may progress to heat stroke.

4.6.3.3. First Aid. Get the individual to a cool shaded area and administer fluids by mouth. Seek medical attention immediately if:

4.6.3.3.1. Symptoms are severe;

4.6.3.3.2. The victim has heart problems or high blood pressure; or

4.6.3.3.3. The victim is unconscious.

4.6.4. Heat Stroke:

4.6.4.1. Definition. Heat stroke occurs when the body becomes unable to control its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106 degrees F or higher within 10-15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

4.6.4.2. Symptoms. Warning signs vary but may include:

4.6.4.2.1. An extremely high body temperature (above 103 degrees F, orally);

4.6.4.2.2. Red, hot, and dry skin;

4.6.4.2.3. Rapid, strong pulse;

4.6.4.2.4. Throbbing headache;

4.6.4.2.5. Dizziness;

4.6.4.2.6. Nausea;

4.6.4.2.7. Confusion; or

4.6.4.2.8. Unconsciousness;

4.6.4.3. First Aid. If you see any of these signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim:

4.6.4.3.1. Get the victim to a shady area.

4.6.4.3.2. Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place in a cool shower; spray with cool water from a garden hose; sponge with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan them vigorously.

4.6.4.3.3. Monitor body temperature and continue cooling efforts until the body temperature drops to 101-102 degrees F.

4.6.4.3.4. If emergency medical personnel are delayed, call a hospital emergency room for further instructions.

4.6.4.3.5. Do not give the victim alcohol to drink.

4.6.5. Sunburn:

4.6.5.1. Definition. A painful skin condition which occurs as a result of overexposure to the ultraviolet rays of the sun. Sunburn affects the body's ability to cool itself and causes a loss of body fluids. It also causes pain and damages the skin. Ultraviolet (UV) rays react with a chemical called melanin that's found in most people's skin; the darker your skin color, the more melanin your skin has to protect itself. The risk for sunburn is increased for persons with fair skin, blue eyes, and red or blond hair. A sunburn develops when the amount of

ultraviolet exposure exceeds what can be protected against by the skin's melanin. Even on cloudy, cool, or overcast days, UV rays travel through the clouds and reflect off sand, water, snow, and even concrete. This "invisible sun" can cause unexpected sunburn and skin damage.

4.6.5.2. Symptoms:

4.6.5.2.1. Skin red and warm to touch;

4.6.5.2.2. Skin may be blistered and (or) swollen (blistering may occur several days after exposure);

4.6.5.2.3. Severe reactions (sometimes called "sun poisoning") may include fever, chills, nausea, or rash; and

4.6.5.2.4. Sunburned skin may peel several days after the sunburn.

4.6.5.3. First Aid:

4.6.5.3.1. Apply cold compresses or immerse the sunburned area in cool water (baking soda in the water may help relieve the pain);

4.6.5.3.2. Apply a soothing moisturizing lotion to affected areas;

4.6.5.3.3. Take aspirin, acetaminophen, or ibuprofen to relieve pain, headache, and to reduce fever;

4.6.5.3.4. Use an over-the-counter topical steroid cream such as Cortaid if the pain persists; and

4.6.5.3.5. Drink plenty of water to replace fluid loss.

4.6.5.3.6. DO NOT:

4.6.5.3.6.1. Use petroleum jelly, ointment or butter (they make the symptoms worse and do not allow air to assist in healing). Avoid using local anesthetic creams or sprays because they cause allergic reactions in some persons;

4.6.5.3.6.2. Break blisters; or

4.6.5.3.6.3. Wash burned skin with harsh soap.

4.6.5.4. Prevention. Sun radiation is very intensive when the sun is highest overhead and is, therefore, the strongest. UV rays are strongest during summer. If you're traveling to a distant location during its summer season, you'll need the strongest sun protection you can

find. Locations near the equator and at high altitudes require additional protection, because the air and cloud cover are thinner, allowing more damaging rays to get through the atmosphere.

4.6.5.4.1. Use a sunscreen with a sun protective factor (SPF) of 15 or more; lighter skin requires a higher SPF number than darker skin. Sunscreens rated higher than 15 are usually less soluble and last longer. Apply sunscreen 30 minutes before going outdoors and reapply according to package directions. Pay special attention to face, nose, ears, and shoulders. **CAUTION:** Some sunscreens cause eye pain and temporary blinding if sweat mixed with sunscreen runs into the eyes. Sunscreens that do NOT sting the eyes are available.

4.6.5.4.2. Use a lip balm with sunscreen.

4.6.5.4.3. Wear clothing that covers the body and a hat, if possible, to shadow the face.

4.6.5.4.4. Wear sunglasses with UV protection whenever possible.

4.6.5.4.5. Be aware that some medications increase the skin's sensitivity to UV rays and even skin that tends not to burn easily can develop a severe sunburn in just minutes. Antibiotics, antihistamines, nonsteroidal anti-inflammatory agents, tranquilizers, diuretics, and antidepressants are among the medications that can increase sun sensitivity.

4.7. Hot Weather Solutions:

4.7.1. Salt and Fluid Replenishment. People often don't replenish the 2-3 gallons of liquid they sweat daily, so no one should rely on "thirst" to signal fluid intake. Therefore, supervisors must implement and enforce policies to ensure workers drink the recommended amount of fluid, even if they are not thirsty. The amount of fluid replacement depends upon the activity, temperature, and how much sweat is generated. Medical personnel can advise how much replacement liquid is required, as well as what type of liquids are recommended (normally, non-carbonated beverages and water). Workers should be encouraged to avoid alcohol and caffeinated beverages because they affect the body's circulatory function and may increase urination and the tendency for dehydration. Drinking highly sweetened beverages is also not recommended. Liquids should be sipped, not gulped and it is better to drink small amounts of water frequently than to drink large amounts occasionally. **THE USE OF SALT TABLETS IS NOT RECOMMENDED.** In addition, supervisors must ensure individuals with medical conditions requiring a low-sodium diet are provided with appropriate liquids.

4.7.2. Adequate Food Intake. Failure to consume sufficient food energy can increase the risk of dehydration and heat injury and illness. Causes of inadequate food intake are: decreased appetite, poor ration palatability, menu boredom, inability to work on a full stomach, lack of water, lack of specific meal periods, lack of time to prepare meals, anxiety due to field conditions, and intentional dieting. In hot weather, the amount of calories required actually

increases slightly although the desire to eat goes down. Appetite suppression is a more serious problem in individuals who are not heat acclimatized.

4.7.2.1. Personnel living and working in temperatures ranging from 86 to 104 degrees F may require up to 10 percent more calories to do the same amount of work as they would under more temperate conditions. Inadequate food intake results in body weight loss which can eventually impair physical and mental performance. Poor food intake decreases the intake of salt necessary to retain water.

4.7.2.2. Individuals consume almost half of all fluids at mealtimes. If personnel skip meals or voluntarily limit their food intake, then the amount of fluids consumed also decreases.

4.7.2.3. Personnel should be encouraged to eat at least two balanced meals per day.

4.7.2. Protective Clothing. Whenever possible, workers should wear loose fitting light-colored clothing and head protection.

4.7.3. Cool Rest Areas. In very hot situations, there should be cool rest areas provided for all individuals working on the project.

4.7.4. Rest Breaks. Rest breaks should be integrated into the work schedule. Work-rest cycles allow the body an opportunity to get rid of excess heat, slow down the production of internal heat, and provide greater blood flow to the skin. Shorter, but frequent, rest breaks are recommended in hot environments. Use intermittent rest periods with water breaks. Ideally, the workload should be distributed evenly over the course of the day.

4.7.5. The “Buddy System.” Use of the “buddy system” to help detect signs of dehydration and illness in others is highly encouraged.

4.7.6. Other Administrative Controls:

4.7.6.1. Reduce the physical demands of work (excessive lifting or digging with heavy objects);

4.7.6.2. Whenever possible, use shifts, such as early morning, cool part of the day, or night work;

4.7.6.3. Use relief workers and worker pacing; and

4.7.6.4. Limit worker occupancy, or the number of workers present, especially in confined or enclosed spaces.

Chapter 5

NATURAL DISASTERS

5.1. Flash Flood Safety:

5.1.1. Flash flood waves, moving at incredible speed, can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels. Killing walls of water can reach heights of 10 to 20 feet. There won't always be a warning that these deadly, sudden floods are coming.

5.1.2. When a flash flood warning is issued for the area or the moment you first realize that a flash flood is imminent, act quickly to save yourself. You may have only seconds.

5.1.2.1. Go to high ground immediately.

5.1.2.2. Get out of areas subject to flooding. This includes dips, low spots, canyons, and washes.

5.1.2.3. Do not attempt to cross a flowing stream on foot where water is above your knees. Do not attempt to drive through flooded areas. Shallow, swiftly flowing water can wash a vehicle from a roadway. Also, the roadbed may not be intact under the water.

5.1.2.4. If the vehicle stalls, abandon it immediately and seek higher ground—rapidly rising water may engulf the vehicle and its occupants and sweep them away.

5.2. Sand and Dust Storm Safety:

5.2.1. A sand or dust storm usually arrives suddenly in the form of an advancing wall of sand or dust and debris which may be miles long and several thousand feet high. They strike with little warning, making driving conditions hazardous. Blinding, choking sand or dust can quickly reduce visibility, causing mishaps that may involve chain collisions, creating massive pileups. Dust storms usually last only a few minutes, but the actions a motorist takes during the storm may be the most important of their life.

5.2.2. Sand and dust storm safety tips follow:

5.2.2.1. If dense sand or dust is observed blowing across or approaching a roadway, pull the vehicle off the pavement as far as possible, stop, turn off lights, set the emergency brake, and take your foot off the brake pedal to be sure the tail lights are not illuminated. **NOTE:** In the past, motorists driving in sand and dust storms have pulled off the roadway, leaving lights on. Vehicles approaching from the rear and using the advance car's lights as a guide have inadvertently left the roadway and in some instances collided with the parked vehicle. Make sure all your lights are off when you park off the roadway.

5.2.2.2. Don't enter the dust or sand storm area if you can avoid it.

5.2.2.3. If you can't pull off the roadway, proceed at a speed suitable for visibility, turn on the vehicle lights, and sound the horn occasionally. Use the painted center line if possible to help guide you. Look for a safe place to pull off the roadway.

5.2.2.4. Never stop on the traveled portion of the roadway.

5.2.2.5. A dust or sand storm warning means visibility of ½ mile or less due to blowing dust or sand, and wind speeds of 30 miles an hour or more.

5.3. Tornado Safety:

5.3.1. A *tornado watch* means conditions are right for tornado development. A *tornado warning* means a tornado has been sighted on the ground.

5.3.2. If a *tornado warning* is issued for your area or whenever a tornado threatens:

5.3.2.1. Stay away from windows, doors, and outside walls. Don't open the windows.

5.3.2.2. Go to a basement or shelter if available or to an interior room on the lowest floor, such as a closet or bathroom. Crouch down and cover your head.

5.3.2.3. Exit vehicles immediately and go to a substantial structure or designated tornado shelter. If no suitable structure is nearby, lie flat in the nearest ditch, ravine, culvert, or other depression and use your hands to cover your head.

5.3.2.4. Leave as soon as tornado danger has passed to avoid swollen stream waters that often accompany thunderstorms.

5.3.2.5. Remember—if you see a tornado and it looks like it is not moving, it might be heading straight at you.

5.4. Hurricane Safety. A hurricane causes sea level to rise above normal tidal heights, with giant wind-driven waves and strong, unpredictable currents. Tornadoes spawned by hurricanes are extremely dangerous.

5.4.1. *Hurricane Watch*—Hurricane conditions pose a possible threat to your area, usually within 36 hours. In especially vulnerable areas, early evacuation may be necessary when a Watch is issued.

5.4.2. *Hurricane Warning*—Hurricane conditions are expected in your area within 24 hours. Areas subject to storm surge or tides should be evacuated as well as areas which could be isolated by flood waters.

5.4.3. When your area receives a hurricane warning:

5.4.3.1. Leave low-lying areas.

5.4.3.2. Protect windows with boards, shutters, or tape.

5.4.3.3. Secure objects outdoors or bring them inside.

5.4.3.4. Fuel vehicles.

5.4.3.5. Save several days' water supply.

5.4.3.6. Stock up on canned food.

5.4.3.7. Check radio and flashlight batteries.

5.4.3.8. Turn up refrigerators to maximum cold and don't open unless necessary.

5.4.3.9. Use the phone only for emergencies.

5.4.3.10. Stay inside on the downwind side if the building is sturdy and on high ground, or in the center of the building, in a closet, or bathroom without windows. In all cases, stay away from windows.

5.4.4. If it becomes necessary to leave, shut off water and electricity at main stations.

5.4.5. Be alert for tornadoes, which can happen before, during, and after a hurricane passes over.

5.4.6. Stay away from flood waters.

5.4.7. Be aware of the calm "eye;" the storm is not over. The worst part of the storm will happen once the eye passes over and the winds come from the opposite direction. Trees, shrubs, buildings, and other objects damaged by the first winds can be broken or destroyed by the second winds whose force is opposite the first winds.

5.5. Tsunami Safety:

5.5.1. The phenomenon we call "tsunami" (soo-NAH-mee) is a series of traveling ocean waves of extremely long length generated by disturbances associated primarily with earthquakes occurring below or near the ocean floor. Underwater volcanic eruptions, explosions, and landslides can also generate tsunamis. In the deep ocean, their length from wave crest to wave crest may be 100 miles or more but with a wave height of only a few feet or less. They cannot be felt aboard ships nor can they be seen from the air in the open ocean. In deep water, the waves may reach speeds exceeding 500 miles per hour.

5.5.1.1. Tsunamis that strike a coastal location in the Pacific Ocean Basin are most always caused by earthquakes.

5.5.1.2. Some tsunamis can be very large. In coastal areas their height can be as great as 30 feet or more (100 feet in extreme cases), and they can move inland several hundred feet.

5.5.1.3. All low lying coastal areas can be struck by tsunamis.

5.5.1.4. A tsunami consists of a series of waves. Often the first wave may not be the largest. The danger from a tsunami can last for several hours after the arrival of the first wave.

5.5.1.5. Tsunamis can move faster than a person can run and can crush homes and other coastal structures. All moving material and water move with great force and can kill or injure people.

5.5.1.6. Sometimes a tsunami causes the water near shore to recede, exposing the ocean floor.

5.5.1.7. The force of some tsunamis is enormous. Large rocks weighing several tons, along with boats and other debris, can be moved inland hundreds of feet by the tsunami wave activity.

5.5.1.8. Tsunamis can occur at any time, day or night.

5.5.1.9. Tsunamis can travel up rivers and streams that lead to the ocean.

5.5.1.10. Offshore reefs and shallow areas may help break the force of tsunami waves, but large and dangerous waves can still be a threat to coastal residents in these areas.

5.5.2. What to do during a tsunami:

5.5.2.1. If you are in a tsunami evacuation zone, evacuate to the evacuation site.

5.5.2.2. If you are at the beach or near the ocean and you feel the earth shake, move immediately to higher ground. DO NOT wait for a tsunami warning to be announced. (A regional tsunami from a local earthquake could strike some areas before a tsunami warning could be announced.) Stay away from rivers and streams that lead to the ocean as you would stay away from the beach and ocean if there is a tsunami.

5.5.2.3. Tsunamis generated in distant locations will generally give people enough time to move to higher ground. Small buildings located in low lying coastal areas are not designed to withstand tsunami impacts. Do not stay in these structures if there is a tsunami warning.

5.6. Earthquake Safety:

5.6.1. An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface.

5.6.1.1. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis).

5.6.1.2. Buildings with foundations resting on unconsolidated landfill, old waterways, or other unstable soil are most at risk. Buildings or trailers and manufactured buildings not tied to a reinforced foundation anchored to the ground are also at risk since they can be shaken off their mountings during an earthquake.

5.6.1.3. Earthquakes can occur at any time of the year.

5.6.1.4. The actual movement of the ground in an earthquake is seldom the direct cause of death or injury. Most casualties result from falling objects and debris because the shocks can shake, damage, or demolish buildings and other structures. Earthquakes may also trigger landslides and generate huge ocean waves (seismic sea waves), each of which can cause widespread injury, death, and destruction.

5.6.2. What to do when the shaking begins:

5.6.2.1. **DROP, COVER, AND HOLD ON!** Move only a few steps to a nearby safe place. Stay indoors until the shaking stops and you're sure it's safe to exit.

5.6.2.2. If inside, get under a sturdy piece of furniture like a desk or table and hold on to it. If the desk or table moves across the floor you will move with it and not be left unprotected. If there is nothing to get under, then get against an inside hallway or stand in a doorway. **NOTE:** In modern homes doorways are no stronger than any other parts of the house and usually have doors that will swing and can injure you.

5.6.2.3. Stay clear of windows, fireplaces, and heavy furniture or appliances. Get out of the kitchen, which is a dangerous place (things can fall on you).

5.6.2.4. Do not run downstairs or rush outside while the building is shaking or while there is danger of falling and hurting yourself or being hit by falling glass or debris.

5.6.2.5. If in bed, hold on and stay there, protecting your head with a pillow.

5.6.2.6. If outdoors, find a clear spot away from buildings, trees, power lines, or anything else that may fall on you. Drop to the ground.

5.6.2.7. If in a vehicle, drive away from bridges, underpasses, or overpasses. Carefully bring the vehicle to a stop in a safe area and set the parking brake. Stay in the vehicle until the shaking stops. If a power line falls on the vehicle, stay inside until a trained person removes

the wire. When you resume driving, watch for breaks in the pavement, fallen rocks, and bumps in the road at a bridge approaches.

5.6.2.8. Expect aftershocks. Each time one is felt, **DROP, COVER, AND HOLD ON!**

Chapter 6

MATERIALS HANDLING EQUIPMENT (MHE) AND AEROSPACE GROUND EQUIPMENT (AGE)

Following are areas to consider:

- 6.1. Are operators trained before using MHE?
- 6.2. Are storage areas kept neat and orderly?
- 6.3. Is workplace housekeeping neat and orderly?
- 6.4. Are forklift operators properly trained for transporting explosives, flammables, etc.?
- 6.5. Is cargo height proper and does not obstruct vision?
- 6.6. Does the operator ensure the load is secured?
- 6.7. Do workers check weight and size of items to be carried and get assistance if bulky or awkward?
- 6.8. Do workers eliminate sharp edges from objects prior to movement?
- 6.9. Do supervisors monitor safe lifting techniques?
- 6.10. When lifting, do workers: keep their back straight, plant feet slightly apart, one behind the other, knees bent, tuck in chin, and center body over their feet?
- 6.11. Do workers watch for slippery surfaces and tripping hazards? Do they keep walkways clear?
- 6.12. Are well-maintained ladders used?
- 6.13. Do workers wear gloves and safety toed shoes?
- 6.14. Are batteries on MHE charged only in designated, approved areas?
- 6.15. Is lighting adequate and approved in storage areas?
- 6.16. Do supervisors ensure MHE speed limits and load limits are not exceeded?
- 6.17. When MHE is left unattended are controls shut off; brake set; and forks, blade, or scoop lowered?

- 6.18. Do operators ensure MHE is not running during refuel?
- 6.19. Are all pallets arriving with three point dunnage, 4 by 4 inches, with a minimum length of 88 inches if dunnage is not available in the marshaling area?
- 6.20. Are pallets and cargo on the pallet free of excessive amounts of grease and oil?
- 6.21. Is tie-down equipment functional?
- 6.22. Is hazardous cargo palletized, readily visible, and easily accessible?
- 6.23. Are the required hazardous labels affixed to the hazardous cargo and visible?
- 6.24. Is dunnage adequately secured to the cargo for air shipment?
- 6.25. Are there sufficient cargo loading teams available?
- 6.26. Is cargo transported to the aircraft in a safe and timely manner?
- 6.27. Are diesel engine vehicles parked and loaded in neutral?
- 6.28. Is a Declaration of Dangerous Goods prepared and attached to all hazardous cargo shipments?
- 6.29. Has the individual received training on hazardous cargo identification and marking?
- 6.30. Are protective equipment and other items provided as required?
- 6.31. Is compatibility maintained for hazardous cargo loaded on the same pallet, according to Air Force Joint Manual (AFJMAN) 24-204, *Preparing Hazardous Materials for Military Air Shipments*?
- 6.32. Does the load team crew chief have the explosive checklist and is it completed prior to loading explosives?
- 6.33. Is the aircraft on an authorized hazardous cargo parking spot and is the plane properly placarded?
- 6.34. Is the fire department notified of hazardous cargo loading operations, i.e., parking spot, class and (or) division, and net explosive weight (NEW)?
- 6.35. Are batteries secured to prevent movement?
- 6.36. Are battery cables disconnected, terminal ends taped, and cables secured to prevent movement?

- 6.37. Are parking brakes set on AGE?
- 6.38. Are checks made for hydraulic leaks, radiator leaks, or hose leaks?
- 6.39. Are door panels and loose items secured by strapping or taping?
- 6.40. Are equipment and vehicles manned when operating?
- 6.41. Are vehicles and trailers chocked while in AGE subpools?
- 6.42. Are grounding straps on tow bars secured to prevent damage and not dragging behind the AGE vehicle?
- 6.43. Is equipment being towed visible during the hours of darkness by some means of reflective markings?
- 6.44. Is all unused equipment stored in a designated area and not left in vehicle thruways?
- 6.45. Are gas caps checked to ensure against pressure overflow?
- 6.46. Are loader operators cautioned to not allow “gravity feeds” to move rolling stock pallets?
- 6.47. Do supervisors allow only single servicing operations on an aircraft when explosives are being loaded?

Chapter 7

TENT CITY

7.1. General. To accomplish the enormous task of siting, erecting, and managing a tent city, filling the position of Tent City Mayor or Sheriff is a wise decision. Site selection is the most important step in building a tent city or erecting a tent for a specific purpose. The site you choose will have a direct impact on the mission so safety, bioenvironmental engineering, public health, and civil engineering personnel should all actively participate in the site selection. For example, consider the mission impact if a tent city is built in an area where water drainage was not considered. The first rain storm every tent has 8 inches of standing water, everyone's gear is soaked, and all the supplies are water damaged. It's now a mosquito-breeding ground and the sanitary waste disposal is jeopardizing the surface water supply. In addition, the affected personnel may develop head colds. All these adversely affect the mission. This is only one example of many which could result from poor site selection. Paragraphs 7.2. through 7.11. contain some basic factors to consider:

7.2. Determine the Purpose of the Tents:

7.2.1. Storage—look for an area that is easily accessible for vehicles, so equipment and supplies can be brought in.

7.2.2. Shower and Latrine—should be central to the billeting tents but at least 100 feet away for sanitary reasons.

7.2.3. Laundry—central to billeting tents but far enough away so the generator noise can be shielded from sleeping tents.

7.2.4. Dining—able to stay dry for sanitary reasons.

NOTE: Refer to public health or bioenvironmental personnel for guidance in sanitation. Planners should contact bioenvironmental engineering for erection of a tent city hazardous waste dump.

7.3. Site Selection Options. When selecting a site, consider the following:

7.3.1. Try to find an area that is level and free from projecting roots or rocks. Use equipment and level the area if necessary. An area with turf grass ground cover is best.

7.3.2. Look at the area for water drainage. If close to a lake or river, stay above the high water marks. Never place a tent in a canyon or dry creek bed, because these areas are known for flash floods.

7.3.3. During hot weather, select a shaded area if possible. Be sure to carefully inspect trees for large dead branches, which could fall during any high winds.

7.4. After the Site is Selected Actions. After a site is selected, do the following:

7.4.1. On snow-covered ground, prod the surface with an ice or ski pole to find any hidden crevices. Pack the top layer of snow with your skis or snowshoes before erecting the tent.

7.4.2. When lifting the tent, start in correct squatting position and use your legs to avoid back injury. Be sure electrical power is disconnected from power source when working with cables or fixtures. Whenever working near frame hinges, be careful to avoid pinching your hands or fingers. Do not hold the hinge itself at the ridge or eave locations. It is essential the entire side of the tent be raised or lowered smoothly and evenly; failure to do so can damage the frame. **NOTE:** Under high wind conditions extra personnel are needed to erect the tent.

7.4.3. Make sure the stovepipe flap is securely tied using the two tie tapes provided when an M-1941 stove is used.

7.4.4. To ensure the site is set up correctly, consider the following:

7.4.4.1. Are there street signs and tent markings? (Assists in identifying emergency location for responding medical, fire, security, and safety personnel.)

7.4.4.2. Is the tent city site located out of munitions clear zones and runway approach and departure zones? Is it logistically laid out to avoid the “maze” effect?

7.4.4.3. Was the site coordinated with the respective weapons safety and airfield management personnel?

7.4.4.4. If waivers are required, are they approved prior to continuation of planning at the site?

7.4.4.5. Do operations facilities (maintenance support tents, operations tents, etc.) planned for the flight line area meet the airfield clearance criteria from taxiways, runways, aircraft parking ramps, engine-runup pads, etc.?

7.4.4.6. Does the tent city layout provide for fire lanes throughout the site that:

7.4.4.6.1. Are adequate for the fire vehicles to get through?

7.4.4.6.2. Provide access from two unobstructed directions?

7.4.4.7. Are fenced-in areas planned with emergency gates to permit ready access by fire-fighting equipment and also to provide for safe evacuation in case of emergency?

7.4.4.8. Is there a fire extinguisher and serviceable smoke detector in every tent?

7.4.4.9. Is there a plan for fire fighting outside tents?

- 7.4.4.10. Have fire alarms (bells, metal rods, or triangles) been placed throughout the area?
- 7.4.4.11. Are exterior area lighting requirements specified and are they adequate for security and safety during night operations? If not, have suitable exterior light fixtures and electric boxes been ordered?
- 7.4.4.12. Is a vehicle parking area planned?
- 7.4.4.13. Is the fuel truck parking area separated from other vehicle parking and 50 feet from spark-producing devices?
- 7.4.4.14. Has a diked fuel storage area (MOGAS and kerosene for heaters and cook stoves) been planned?
- 7.4.4.15. Are “Hazardous Areas”, “No Smoking”, and Fire Symbol signs available?
- 7.4.4.16. Is the fuel storage area 50 feet from flame- or spark-producing devices?
- 7.4.4.17. Are metal drip pans available for every heating stove and cooking apparatus?
- 7.4.4.18. If planning to use M1941 stoves, is insulating material (sand or fire bricks) available to place between the wood flooring and drip pan?
- 7.4.4.19. If M2 burners are used, are they inspected, cleaned, and serviced at least on a daily basis—more frequently as use dictates?
- 7.4.4.20. Are burners completely cooled before being carried into the refueling pit and refueled?
- 7.4.4.21. Are burner maintenance and refueling operations separated from burner lighting operations by 50 feet or does an equivalent barricade separate the two operations?
- 7.4.4.22. Are floors well supported, level, and free of large cracks?
- 7.4.4.23. Are tents well-staked in case of high winds?
- 7.4.4.24. Are tent liners properly installed (instructions posted at the end of the tent)?
- 7.4.4.25. Are liners tied under the ridgepole?
- 7.4.4.26. Are tent liners properly tied off around stove pipe openings so the liner does not touch the stove pipe?

7.4.4.27. Is there a carbon monoxide detector in each tent that is equipped with a stove that has the capability to produce carbon monoxide?

7.4.4.28. If heaters are used, are personnel aware of the following:

7.4.4.28.1. The tent **MUST** be occupied when the heater is on?

7.4.4.28.2. The last person leaving the tent must turn the heater off. However, the ranking person is ultimately responsible?

7.4.4.28.3. Unless trained, occupants **WILL NOT** attempt to fix the heater?

7.4.4.28.4. Garbage will not be thrown into the heater?

7.4.4.28.5. The heater **MAY NOT** be used as a cooking unit?

7.4.4.28.6. The heater should not be operated on the highest setting?

7.4.4.28.7. The heater is not to be used as a dryer for anything?

7.4.4.28.8. The tops of heaters will be kept free of all articles at **ALL** times?

7.4.4.28.9. All objects are to be kept at least 36 inches (3 feet) from the heater?

7.4.4.29. Are the following actions taken to ensure stovepipe safety:

7.4.4.29.1. Are stovepipes tightly joined along the vertical seam (this is to mitigate carbon monoxide poisoning hazards)?

7.4.4.29.2. Are stovepipe sections tightly joined together, and if held together by rivets, are the rivets of a material other than aluminum?

7.4.4.29.3. Do the stovepipes have weather caps?

7.4.4.29.4. Are they well seated in the top of the stack?

7.4.4.29.5. Does the stack extend well above the tent to eliminate the possibility of a fire?

7.4.4.29.6. Are the stovepipe stacks firmly anchored with guy lines in the event of strong winds?

7.4.4.30. Are the following considered concerning electrical equipment:

7.4.4.30.1. Are electrical line installations to the tent constructed to prevent a tripping hazard?

7.4.4.30.2. Are electrical line splices properly wrapped and waterproofed to prevent shocking hazards or arcing (fire) hazards?

7.4.4.30.3. Are waterproof electrical boxes used in exterior areas where required?

7.4.4.30.4. Are waterproof exterior fixtures used for exterior lighting?

7.4.4.30.5. Are fixtures suitably protected from the elements to prevent shocking or arcing?

7.5. Cook Tents:

7.5.1. Are burner-refueling areas located 50 feet from tents and facilities and lighting and generator equipment?

7.5.2. Is the accumulation of grease on tent surfaces monitored and periodic cleaning accomplished?

7.5.3. Are disposal areas for grease at least 8 feet from the tent?

7.5.4. Are a minimum of two fire extinguishers provided for cooking areas? (Extinguishers should be located and unobstructed at the entrances to the cooking areas.)

7.5.5. Is the electrical distribution panel located at least 6 feet from the kitchen tent? Is it the protected connector type?

7.5.6. Are electrical generators positioned at least 15 feet from tent walls? (Fuel tanks should be positioned as remotely as possible from generators and diked with fuel lines protected.)

7.5.7. Are portable hot water heaters set at least 20 feet from the dispensing area?

7.5.8. Are adequate unobstructed aisles and exits maintained?

7.5.9. Are gasoline ovens located away from tent walls (3 foot minimum)?

7.5.10. Are fans or other means available to exhaust carbon monoxide fumes generated by the gasoline stoves?

7.5.11. Are ovens, immersion heaters, and stoves insulated from wooden floors?

7.5.12. Are the stovepipes to these units insulated from the tent and wooden floors?

7.5.13. Are water heaters located on metal or insulated floors and not directly on wooden floors?

7.5.14. Are wooden grease traps located away from ignition sources?

7.5.15. Are lighting fixtures guarded (globe over bulb or florescent tube shielded) over food servicing line to protect food from broken glass?

7.5.16. Are floors kept clean and grease free?

7.5.17. Are paper and waste products properly disposed of?

7.5.18. Are cutlery and other sharp kitchen implements guarded?

7.5.19. Are storage areas kept clean and neat?

7.5.20. Are heavy items (cans, jars, pots, etc.) stored on lower level shelves?

7.5.21. Do dining hall personnel wear hard toe shoes?

7.6. Shower And Latrine Tents:

7.6.1. Are water heaters located on metal or insulated floors and not directly on wooden floors?

7.6.2. Is the sewer drainage system adequate to prevent health hazards?

7.6.3. Is heater temperature set low enough to prevent scalding?

7.6.4. Are stoves and electrical wiring located well away from shower areas?

7.6.5. Are fire alarm systems located in or near shower and latrine tents?

7.6.6. Are there fire extinguishers located in or near the shower and latrine tents?

7.6.7. If shower tents are elevated (on back of semi-trailers) are handrails installed with the stairway?

7.7. Fuel Storage Areas:

7.7.1. Are bulk tanks located 50 feet from open flames or other spark-producing devices?

7.7.2. Are fuel storage areas diked?

7.7.3. Are fire warning signs posted on all four sides of fuel storage areas?

7.7.4. Are drip pans available for dispensing stations?

7.7.5. Are fuel cans or jerry cans screwed tight to prevent leaks?

7.7.6. Are leaking fuel cans removed from service?

7.7.7. Are spills cleaned up immediately?

7.7.8. Are open tanks or drums grounded?

7.7.9. Is the area maintained in a neat and orderly fashion?

7.7.10. Are fire extinguishers properly located in unobstructed areas? Are they checked periodically for serviceability?

7.8. Smoking Areas:

7.8.1. Is the area properly identified by an approval letter from the fire chief?

7.8.2. Are suitable receptacles available?

7.8.3. Are “No Smoking” signs posted where required?

7.8.4. Is a serviceable fire extinguisher available?

7.9. Camouflage:

7.9.1. Successful camouflage is the concealing of installations and activities by hiding, blending, and disguising an object or activity of military significance to deceive observers on the ground or in the air.

7.9.2. The following are some potential hazards resulting from the use of camouflage:

7.9.2.1. Effective placement of camouflage netting often requires climbing on top of buildings or other areas not normally used, even by the people most familiar with the facility. Are proper sized ladders used? Is non-slip footwear worn?

7.9.2.2. Are procedures and safety equipment in place to protect from falls during placement of camouflage netting from buildings roofs?

7.9.3. Tent leaders will ensure camouflage netting is erected outside tents only. It must be removed by the user and (or) occupant if it interferes with maintenance or construction work within Tent City. It must not:

7.9.3.1. Obstruct fire lanes, overhangs, or main walkways;

7.9.3.2. Be tied to any electrical panel or box; or

7.9.3.3. Be attached at any sheet metal screws, metal flashing, or roof overhang.

7.10. Responsibilities:

7.10.1. Tent Leader:

7.10.1.1. Do senior ranking members of each occupied tent or module understand they will be the tent leaders and will ensure these rules are understood and followed?

7.10.1.2. Does the tent leader ensure each facility has a working smoke detector mounted at a high point in the tent and clear from the air ducts or obstruction? (Test smoke detectors weekly.)

7.10.1.3. Does the tent leader ensure each facility has a working fire extinguisher at a door or at a center pole? (Tampering with fire extinguishers is a punishable offense.)

7.10.1.4. Do tent leaders ensure quiet hours are established and followed (i.e., 2200 to 0600)? (Respect and courtesy for your neighbor's desires and rest requirements are essential for mission requirements and safety. Shift workers usually reside in your community and may require alternate quiet hours.)

7.10.1.5. Do tent leaders ensure camouflage netting is erected per the requirements of paragraph 7.9.3.?

7.10.1.6. Does the tent leader ensure all partitions are fully removable, to ensure the tent can be utilized in surge conditions within 24 hours?

7.10.1.6.1. An unobstructed, 32-inch wide (minimum) center aisle from the front door to the back door must be provided for the occupant to reach the exit from any partitioned area.

7.10.1.6.2. Partitioned areas must have an unobstructed, minimum, 28-inch wide opening to egress to the center aisle.

7.10.1.6.3. Plywood partitions must conform to fire safety requirements and be approved and installed by Civil Engineering (CE).

7.10.1.6.4. Soft partitions must be constructed so they can be pushed aside for emergency egress. (They cannot be rigidly fastened in place.)

7.10.1.7. Does the tent leader ensure tent electrical systems, including light sets, are not used in any way as support for partitions? (Nothing may be suspended from light set wiring. In addition, partitions must be constructed so light bulbs are not within 4 inches of the partition.)

7.10.1.8. Does the tent leader ensure supplemental heating such as space heaters are not used, unless approved by CE?

7.10.1.9. Does the tent leader ensure extension cords are rated at 15 amps or higher and have a grounded three prong plug?

7.10.1.10. Does the tent leader ensure 60-watt bulbs are the maximum power authorized?

7.10.1.11. Do tent leaders and occupants understand Services, Fire, and Safety officials reserve the right to enter and inspect any unit for safety, health, sanitation, and quality of life concerns as well as for the removal of contraband or restricted items? Do they also understand that discrepancies must be corrected within 24 hours?

7.10.2. Occupants:

7.10.2.1. Do occupants understand and comply with absolutely no open-flame or hot plate cooking?

7.10.2.1.1. Microwave and coffee makers are allowed when approved by the fire department.

7.10.2.1.2. Food must be kept in sealed containers or refrigerators and stored off the floor.

7.10.2.1.3. Occupants may not leave open food containers and garbage inside the tent.

7.10.2.2. Do occupants understand and comply with no smoking in any facility? (Personnel should not spit or leave “chew” on the ground or sidewalks. Wet tobacco should be disposed of in a trash can. Butt cans should be used for tobacco products only.)

7.10.2.3. Do occupants understand and comply with an exit-way from front to back door? (The exit-way must remain clear for each occupant to exit the facility.)

7.10.2.4. Do occupants understand no self-help electrical work is authorized?

7.10.2.5. Do occupants understand bonfires, pit fires, or standing barrel fires are not authorized? Any open flames must be in a suitable container? (Never leave fire unattended.)

7.10.2.6. Do occupants understand storage of combustible material in tents or modules is not permitted?

7.10.2.7. Do occupants understand garbage cans must be kept free of overflow? (Keep lids on cans. Residents are responsible for emptying contents into dumpsters daily in order to reduce health risks and pest infestation.)

7.10.2.8. Do occupants understand outdoor BBQ grills will be at least 15 feet from any structure? (To dispose of coals, pour ashes into specially marked trash cans, with water, and allow to cool 8 hours before dumping into dumpsters. Do not dump ashes or coals on the ground.)

7.10.3. Fire Prevention:

7.10.3.1. Is a night tent fire watch program established and coordinated with fire department personnel?

7.10.3.2. Is a daily walk-through the tent city area made by the camp fire marshal and safety officials?

7.10.4. Vehicle Operators. Do vehicle operators understand, for fire safety reasons, vehicle parking is authorized in designated areas only?

7.10.4.1. Vehicles should not be parked between or next to tents or modular living units.

7.10.4.2. The Tent City speed limit is usually no more than 15 kilometers per hour (kph) or 10 miles per hour (mph).

7.10.4.3. Perimeter and interior fire lanes will be kept clear.

7.11. Restrictions. Do not use the Yukon Stove (M-1950) in extendible modular tents.

Chapter 8

DEFENSIVE FIGHTING POSITIONS (DFP)

Following are areas to consider:

8.1. Do supervisors ensure alternate entrance and exit doors to buildings are not physically blocked or barricaded to maintain single point entry?

8.2. Are defensive positions constructed away from locations that may put the defender's personal safety in jeopardy, (away from fuel tank vents, edges of roofs, high voltage equipment, etc.?)

8.3. Are defensive shelters, built on top of structures such as aircraft shelters, blastwalls, or towers, equipped with appropriate fall protection?

8.4. Are exercise fire-fights on top of certain areas prohibited as determined by the controllers or exercise evaluation team (EET) members, to prevent personnel from falling?

8.5. Are existing sandbag shelters checked for structural integrity prior to start exercise (STARTEX)?

8.6. Are wooden boards used in shelters checked for structural integrity and adequate size for the bearing load (no rotten wood)?

8.7. Does DFP construction compensate for unlevel ground?

8.8. Do workers ensure the following materials are NOT used?

8.8.1. Plywood less than three-fourths of an inch in thickness;

8.8.2. Warped, bent, or brittle wood or metal;

8.8.3. Materials saturated with chemical residue (fuel, oil, etc.);

8.8.4. Used tires that are wet inside;

8.8.5. Exposed nails and jagged or sharp edges in the building material?

8.9. Do DFPs have the following attributes?

8.9.1. Wall material must be overlapped in two directions or otherwise interlock.

8.9.2. Walls must not lean outward or inward.

8.9.3. Wall thickness must be a minimum of two sand bags laid flat side by side or the length of one sand bag.

8.9.4. Roofs shall not deflect downward along the edges or the interior, greater than 1 inch.

8.9.5. When railroad ties, runway matting, planks, or similar material is used for roof construction, walls must be “L”-shaped, four sand bags thick, and interlocked at the corners.

8.9.6. Water-repellent material, i.e., plastic sheeting, can be used as long as it does not affect the stability of the DFP walls or roof.

8.10. In addition to the above, are the following requirements met for DFPs on top of facilities?

8.10.1. Authorization from the civil engineering section to determine the additional weight of DFP will not damage the facility.

8.10.2. Access to DFP must be clear of obstructions.

8.10.3. DFPs should be no closer than 6 feet from any edge of the roof.

8.10.4. When DFPs are located 4 feet or more off the ground and no guard rail is installed, precautions need to be taken to prevent the DFP user from mistakenly walking off the edge of the facility. For example: ensuring the DFP entrance and exit are away from the edge of the facility.

8.10.5. When DFPs are located 4 feet or more off the ground with no permanently fixed stairs, portable ladders are acceptable substitutes. Portable ladders for DFP may be commercial or locally built. **NOTE:** For DFPs less than 4 feet off the ground, steps may be constructed. Each step shall not exceed 8 inches in height, will be at least 9 inches deep to allow for safe and secure footing with a maximum of four steps.

8.11. Is reconstruction done for the following if:

8.11.1. Roofs deflect downward more than 1 inch?

8.11.2. Walls, entrances, or gunport openings lean in or out (visible)?

8.11.3. Ladder or step conditions exist which are not in compliance with the guidelines in [paragraph 8.10.5](#)?

8.12. During Nuclear, Biological, Chemical (NBC) Operations, Mission-Oriented Protective Postures (MOPP), is the following understood: MOPP only applies if there is a threat of chemical-biological (CB) agent use (refer to AFMAN 32-4005, *Personnel Protection and Attack Actions*)? When under MOPP conditions, supervisors will:

8.12.1. Caution personnel that protective masks will require more maintenance in a hot, sandy environment (sand will clog filters and cause valves to malfunction).

8.12.2. Remind personnel that amyl acetate (banana oil) vapor is toxic and flammable. Caution them to check the seal of the protective mask in a well-ventilated area away from heat and flames.

8.12.3. Ensure personnel increase water consumption correspondingly.

8.12.4. Have personnel practice drinking while wearing the mask.

8.12.5. Remind personnel that restrictions on drinking alcohol is even more important when in MOPP.

8.12.6. Plan additional time to conduct operations (up to 6 times longer). Rotate personnel more often.

8.12.7. Allow personnel to loosen protective clothing as the situation permits.

8.12.8. Employ the buddy system to check for heat injuries. Ensure leaders are included.

8.12.9. Delegate tasks to subordinates to reduce stress and fatigue (leaders frequently suffer adverse effects of operating in MOPP).

8.13. Do personnel understand that inadequately constructed survivability positions can turn into death traps? With that understanding, the following applies:

8.13.1. Commander's Responsibility:

8.13.1.1. Improve and maintain unit survivability continuously.

8.13.1.2. Provide materials.

8.13.1.3. Supervise construction.

8.13.1.4. Inspect periodically.

8.13.1.5. Plan and select fighting-position sites.

8.13.1.6. Get technical advice from engineers as required.

8.13.2. Construction Tips:

8.13.2.1. Dig down as deep as possible. Don't build above-ground unless absolutely necessary.

- 8.13.2.2. Don't use sand or sandbags for structural support.
- 8.13.2.3. Maintain, repair, and improve positions continuously.
- 8.13.2.4. Inspect and test position safety daily, after heavy rain, and after receiving direct and indirect fires.
- 8.13.2.5. Revet (face with masonry or other material) excavations in sandy soil.
- 8.13.2.6. Don't drive vehicles within 6 feet of a position.
- 8.13.2.7. Interlock sandbags for double-wall construction and corners.
- 8.13.2.8. Don't take shortcuts.
- 8.13.2.9. Check stability of wall bases. Don't forget lateral bracing on stringers.
- 8.13.2.10. Don't put personnel in marginally safe bunkers.
- 8.13.2.11. Don't overfill sandbags; fill them approximately three-quarters full.
- 8.13.3. Built-Up Positions:
 - 8.13.3.1. Use only when absolutely necessary (e.g., bedrock prevents excavation).
 - 8.13.3.2. Use only appropriate construction and structural material.
 - 8.13.3.3. Don't use sandbags as structural support (e.g., sandbag wall as support).
- 8.13.4. Soil Considerations:
 - 8.13.4.1. Remind personnel that rain, vibration, and vehicle traffic will weaken the soil. Also, open excavations will not hold a side wall; they cave in and collapse.
 - 8.13.4.2. Maintain position by periodically inspecting revetment walls, cover, waterproofing, and slopes. If bunker walls or roofs are bowing, reinforce them or abandon them. Inspect stringers for wear, cracks, bends, and bows. Replace if necessary.
 - 8.13.4.3. After an artillery or missile barrage—test, inspect, and repair position.

Chapter 9

FLIGHT LINE

9.1. General Flight Line:

- 9.1.1. Are spotters used when aircraft are taxied within 10-25 feet of an obstacle?
- 9.1.2. Are aircraft towed if within 10 feet of an obstruction?
- 9.1.3. Are ejection seat safety pins installed at all times while aircraft are on the ground except for system maintenance?
- 9.1.4. Does the crew chief accompany the pilot on the preflight?
- 9.1.5. Have delayed discrepancies been cleared?
- 9.1.6. Are disconnected air, oil, fuel, hydraulic lines, and cannon plugs covered to protect them from contamination?
- 9.1.7. Are bunny suits used for intake inspections? Are they worn properly?
- 9.1.8. Are personnel prohibited from wearing finger rings while working on aircraft?
- 9.1.9. Are intake covers used?
- 9.1.10. Do all safety pins, locks, covers, etc., have “remove before flight” streamers?
- 9.1.11. Is equipment properly pre-positioned for emergency actions around aircraft?
- 9.1.12. Are the correct size screws and fasteners used when installing panels? Is technical data used to ensure the proper length screw is installed?
- 9.1.13. Is an in-process inspection (IPI) program in effect? Are IPIs listed and are maintenance personnel familiar with them?
- 9.1.14. Do supervisors check the mechanic’s knowledge of TO reference for work being performed? What step of the operation is the person involved in?
- 9.1.15. Are management procedures in effect to ensure samples are forwarded to the laboratory on a timely basis?
- 9.1.16. Is adequate lighting available and in use for night maintenance operations?

- 9.1.17. Is an effective hazard reporting program in being throughout the maintenance complex? Are maintenance personnel thoroughly familiar with reporting procedures and do supervisors encourage submission of hazard reports on valid hazards?
- 9.1.18. Are supervisors familiar with their responsibilities and roles in the unit safety program?
- 9.1.19. Are personnel who accomplish engine runs qualified according to requirements in existing directives?
- 9.1.20. Are safety precautions taken around engine intakes and exhausts during engine-run operations?
- 9.1.21. Are engine-run screens and anti-personnel screens utilized and inspected according to existing directives?
- 9.1.22. Are personnel who enter or work in aircraft cockpits trained in cockpit familiarization?
- 9.1.23. Is required protective gear available and used by servicing crews?
- 9.1.24. Has the unit commander identified high-hazard areas?
- 9.1.25. Are aircraft grounded as required by TO 00-25-172 and the aircraft Dash 1 and Dash 2?
- 9.1.26. Are external tanks grounded when they are removed from the aircraft?
- 9.1.27. Are fuel bowsers grounded and not leaking or overflowing?
- 9.1.28. Are aircraft observed to ensure they do not vent fuel on the ramp?
- 9.1.29. Are external fuel tank drain procedures according to existing directives? Are the standpipes covered?
- 9.1.30. When tanks are delivered to the fuel shop storage, are AFTO Forms 350, **Repairable Item Processing Tag**, properly filled out, the tank grounded, and fuel shop personnel notified?
- 9.1.31. Is smoking prohibited on the flight line except in designated locations?
- 9.1.32. Are suitable workstands used by maintenance personnel?
- 9.1.33. Are personnel prohibited from standing on the rails to perform work?
- 9.1.34. Are brakes set at all times when the stand is not being used?
- 9.1.35. Are stands lowered after use?

- 9.1.36. Are personnel prohibited from riding on mobile stands while they are being moved?
- 9.1.37. Are suitable fire extinguishers placed close to ground power equipment used in maintaining or servicing aircraft?
- 9.1.38. Are adequate written operating procedures prepared covering safety precautions for hangaring of aircraft?
- 9.1.39. Are maintenance stands inspected daily and properly stored and secured to prevent collision with aircraft, vehicles, etc.?
- 9.1.40. Are vehicles prohibited from being parked closer than 10 feet to aircraft except for loading?
- 9.1.41. Is AGE equipment chocked unless it has an operating brake?
- 9.1.42. Do personnel wear proper ear protection around engines, power carts, and runways?
- 9.1.43. Do nonessential personnel remain clear during refueling and loading operations?
- 9.1.44. During concurrent servicing operations does the Chief of Servicing coordinate with maintenance, loading, and refueling?
- 9.1.45. Are power carts extended full length?
- 9.1.46. Is bonding accomplished during refueling?
- 9.1.47. Does aircraft parking allow for direct access of emergency vehicles?
- 9.1.48. Do work areas remain orderly?
- 9.1.49. Are self-closing containers made available for oily rags?
- 9.1.50. Are fire lanes in and outside buildings kept clear?
- 9.1.51. Are the following requirements met?
- 9.1.51.1. Taxi lines and nose wheel stop marks must be clearly visible. Take measurements to ensure they are adequate for the deployed aircraft.
 - 9.1.51.2. Aircraft must be parked with nosewheels on nosewheel-stop marks.
 - 9.1.51.3. Aircraft must be aligned with taxi parking line.

9.1.51.4. Individuals must not lie down on unlighted ramps.

9.1.51.5. In peace time, personnel on the flight line must wear reflective material (reflective belt) on their outer garment during hours of darkness. Aircrew members are exempt if they are present for crew duties and within 50 feet of the aircraft. They may substitute a lighted flashlight for the reflective belt.

9.1.51.6. The ramp must be clear of all foreign object debris that could cause damage to engines, tires, or other equipment.

9.1.51.7. Smoking is not permitted within 50 feet of an aircraft. Smoking is not permitted within 100 feet of the aircraft during hazardous ground operations (refueling, LOX servicing, explosives handling, or hazardous cargo handling). Appropriate signs will be posted when required. Only personnel involved in the hazardous ground operation should be present (within 100 feet of the perimeter of the working area).

9.1.51.8. Ear protection must be worn around operating aircraft and equipment.

9.1.51.9. Finger rings will not be worn while working in, on, or around aircraft. Watches and bracelets will not be worn when working around electrical circuits.

9.1.51.10. All personnel will avoid exhaust areas.

9.1.51.11. Serviceable fire bottles, per TO 00-25-172, will be present on the ramp; the number depending on the aircraft. Aerospace ground equipment (AGE) operated in the area of an aircraft may share the aircraft fire bottle. If the AGE is operated at a remote location, it will have its own serviceable fire bottle present.

9.1.51.12. All aircraft engine starts require a ground monitor.

9.1.51.13. Workers will ensure equipment (tiedown chains, chocks, wrenches, etc.) is not thrown about the aircraft or placed where it might be forgotten and become a foreign object.

9.1.51.14. No equipment will be refueled or otherwise serviced within 50 feet of an aircraft.

9.1.52. Are caution signs directing attention to hazards present in jet runup areas posted at entrances, gates, and other approaches to jet runup areas?

9.2. Aircraft Parking Plan:

9.2.1. Check the available ramp space at the deployed location. Contact the Wing Plans Officer and the Deploying Maintenance Supervisor to see what kind of room will be available for the aircraft.

9.2.1.1. If the allocated space will not permit required separation for either taxiing or parking the number and type of aircraft deploying, try to arrange for additional space to obtain the required separation. If additional space can not be obtained, identify a point at which aircrews can safely taxi to park the aircraft so maintenance can tow the aircraft to final parking.

9.2.1.2. Ensure actual separation distances are included on the parking plan. In addition, ensure all maintenance personnel and aircrews are briefed on any less than usual distances for taxiing or parking and any special procedures. Don't forget wing walkers are required for obstacle clearances between 10 and 25 feet.

9.2.2. After arriving at the deployed location ensure the following:

9.2.2.1. Is there a driving plan (arrows for driving direction)?

9.2.2.2. Are the rows lettered and numbered?

9.2.2.3. Are the restricted area entry control points placed for ease of access for emergency vehicles?

9.2.2.4. Is there proper distance between aircraft? (Example: A C-130 is 133 feet wide and 100 feet long. To allow 25 feet between wing tips (side by side), place nose wheel spots 158 feet apart. To get the minimum required 30-foot wing-tip taxi clearance between rows of parked aircraft (nose to tail), place nose wheel spots 293 feet apart. **NOTE:** Distances less than those listed should be clearly identified on the parking plan and briefed to all personnel.

9.2.2.5. Are taxi lines clearly and properly identified?

9.2.2.6. Is there coordination of parking plan with Logistics and Security Forces personnel prior to reproduction of the plan?

9.2.2.7. After reproduction, are the restricted areas outlined in red?

9.2.2.8. Are copies of the parking plan distributed to flight line vehicle operators and mission support, operations, security forces, fire department, and medical and ambulance personnel?

9.2.2.9. If weapons or explosives are on board, are aircraft parked in explosives sited areas appropriate for the type and quantity of weapons or explosives involved?

9.2.3. Ensure safety officials are contacted for the following:

9.2.3.1. All mishaps.

- 9.2.3.2. Local hazards and restrictions.
- 9.2.3.3. Local flight line smoking restrictions.
- 9.2.3.4. Fuel spills.
- 9.2.3.5. Location and capability of nearest hospital.
- 9.2.3.6. Local collision avoidance procedures.
- 9.2.3.7. Safety publications location.
- 9.2.3.8. Unusual weather patterns.

9.2.4. Ensure the following:

- 9.2.4.1. Has a hot brake area been established?
- 9.2.4.2. What are the engine-run restrictions (time of day and location)?
- 9.2.4.3. Has a hot gun area been established?
- 9.2.4.4. Have signs been placed in conspicuous places with instructions how to contact the safety representative to report hazards and mishaps?
- 9.2.4.5. Are Hazard Reports (AF Form 457) readily available?
- 9.2.4.6. Is a log with all safety discrepancies and corrective actions kept by the safety representative?
- 9.2.4.7. Do all pertinent people and offices know how to reach the safety professional, or commander's representative on station, by telephone and radio?

9.3. Foreign Object Damage (FOD) Incident:

- 9.3.1. Have all details been logged?
- 9.3.2. Do you work with the deployed maintenance officer in reporting the mishap?
- 9.3.3. Have you notified host and home unit safety officials?
- 9.3.4. Have the required messages been completed?

9.4. Maintenance Operations Center (MOC):

9.4.1. Does the MOC ensure wing safety officials and the command post are notified of mishaps involving aircraft, FOD, or injuries during aircraft maintenance?

9.4.2. Does the MOC maintain checksheets for use in the event of an aircraft crash, flight line fire, and other unusual circumstances?

9.5. Forms Documentation:

9.5.1. Are all Red X maintenance actions documented on the aircraft forms per TO 00-25-172?

9.5.2. Are delayed discrepancies of a nature that if not corrected could affect safety of flight?

9.5.3. Are all operational leak checks documented on the aircraft forms?

9.5.4. Are exceptional releases signed off by the maintenance officer or a designated nine-level representative?

9.5.5. Are Red X items properly cleared by supervisory personnel?

9.5.6. Is adequate corrective action taken on write-ups?

9.5.7. Are pilot write-ups given the correct symbol?

9.5.8. Do the AFTO 781 forms reflect the current status of the aircraft?

9.5.9. Are all AFTO Forms 781A, **Communication Security Equipment Record**, accounted for at the aircraft and at plans and scheduling? (There should be 781 forms covering the previous 3 months and the current month.)

9.6. Aircrew Debriefing:

9.6.1. Is proper documentation being filled out by debrief?

9.6.2. Are specialists used to debrief complex write-ups?

9.6.3. Are all required regulations, technical orders, and operating instructions available?

9.6.4. Do pilot write-ups contain enough information for adequate trouble shooting?

9.6.5. Do debriefers track write-ups and classify them properly as to “repeat” or “recur”?

9.6.6. Are repeat and recurring write-ups identified in the AFTO Form 781A discrepancy block?

9.6.7. Are debriefers familiar with requirements for impoundment of aircraft following flight or ground incidents involving safety of flight?

9.6.8. In case of a ground abort, do aircrews make an entry on the AFTO Form 781A before proceeding on to the next aircraft?

9.6.9. Is the debrief section adequately manned?

9.6.10. Are fault reporting manuals and codes used?

9.6.11. Are all appropriate crew members thoroughly debriefed to ensure all information concerning aircraft discrepancies is recorded?

9.7. Aircraft Launch And Recovery:

9.7.1. Are maintenance personnel qualified to perform start, launch, and recovery procedures?

9.7.2. Is a serviceable fire bottle available?

9.7.3. Are current, applicable checklists on hand?

9.7.4. Is a consolidated tool kit (CTK) inspection performed prior to launch?

9.7.5. Do personnel involved with start and launch have ear protection?

9.7.6. Is a FOD walk performed prior to engine start?

9.7.7. Is a communication cord in use? If hand signals are used, are they correct?

9.7.8. Are all flight control checks performed? Is a visual of brake operation performed, if applicable?

9.7.9. Are all panels installed and doors closed prior to taxi?

9.7.10. Are chocks installed until the proper signal is given to remove them?

9.7.11. On recovery, are communication and visual established between ground crew and pilot before shutting down engines?

9.7.12. Are remaining safety pins installed?

9.8. Flight Line Loading Operations:

9.8.1. Do loading personnel and aircrew loadmasters coordinate with one another?

- 9.8.2. Are aircraft loading struts positioned prior to loading?
- 9.8.3. Do workers wear gloves during handling?
- 9.8.4. Do personnel know not to walk behind cargo being winched or driven up ramps?
- 9.8.5. Are personnel kept from stepping across the winch cable when under load?
- 9.8.6. Do winching operations cease during refueling operations?

9.9. Jacking Operations:

- 9.9.1. Are appropriate warning signs posted when aircraft jacking operations are conducted?
- 9.9.2. Is jacking of aircraft supervised and performed by qualified personnel?
- 9.9.3. Are aircraft NOT left on jacks overnight except when absolutely necessary?
- 9.9.4. Is the aircraft safe for maintenance?
- 9.9.5. Are all munitions downloaded prior to jacking?
- 9.9.6. Are all jacks correctly seated?
- 9.9.7. Are all jack ram locknuts down?
- 9.9.8. Are jack ram extension limits not exceeded?
- 9.9.9. For nose wheel jacking, is the nose wheel centered?
- 9.9.10. Is correct technical data available?
- 9.9.11. Are minimum structural door requirements for jacking met?
- 9.9.12. Is the aircraft grounded if required?
- 9.9.13. Are fire bottles positioned?
- 9.9.14. Are "Aircraft on Jacks" signs posted?
- 9.9.15. When jacking outside, is the maximum wind velocity of 15 mph observed?
- 9.9.16. Are work stands and other equipment not required for jacking or essential maintenance removed from under the aircraft?

9.9.17. When an aircraft is being raised or lowered during jacking operations in a hangar, are hangar doors closed?

9.9.18. Are jacks inspected before use to verify lifting capacity, proper functioning of safety locks, condition of pins, and serviceability?

9.9.19. Is weight of aircraft distributed to establish center of gravity before jacking?

9.9.20. Are chocks removed and released prior to jacking?

9.9.21. Are locking pins or nuts set immediately after jacking is complete?

9.9.22. Is there a space of 25 feet between the aircraft and the hydraulic pumping unit?

9.9.23. When making retraction tests, are directions given verbally or by using an interphone system only after visual assurance the wheel well and swing are clear?

9.9.24. Are personnel prevented from passing under, climbing, or walking on any portion of an aircraft which is entirely supported by jacks?

9.9.25. When aircraft is resting on jacks and landing gear is clear of the floor, are engines or other major components prevented from being changed unless directed by technical data?

9.9.26. Prior to releasing jack pressure and lowering aircraft, is the underneath of aircraft cleared?

9.9.27. Are only personnel required to operate jacks and free struts allowed to remain in the vicinity during the lowering of the aircraft?

9.9.28. Are there personnel assigned to monitor each jacking point and the center of balance?

9.10. Towing:

9.10.1. Does the team chief have in his or her possession, and use, an adequate checklist?

9.10.2. Does the team chief walk in full view of the tow vehicle operator and the aircraft, and do wing walkers actually walk at the wingtips?

9.10.3. Do team members have luminous wands for nighttime operations?

9.10.4. Are proper chocks in place before the towing vehicle is disconnected?

9.10.5. Are necessary doors and panels closed and down locks and pins installed before towing is started?

- 9.10.6. Are brake systems fully charged before towing?
- 9.10.7. Are tow vehicles and the tow bar inspected prior to tow?
- 9.10.8. Are struts and tires checked for proper inflation prior to towing?
- 9.10.9. Are correct speed limits observed?
- 9.10.10. Does the towing team consist of a supervisor of towing team who is also the nose walker, a vehicle operator, two wing walkers (except on approved taxi lines), one tail walker (only required for sharp turns and backing), and one person in the pilot's seat?
- 9.10.11. Does the person in the cockpit monitor ground control frequency? (Look for headset use.)
- 9.10.12. Is the crew entrance door closed and locked during all towing operations?
- 9.10.13. Is the nose walker (supervisor) in contact with the person in the cockpit by interphone when directed by aircraft technical data?
- 9.10.14. Does the team know the nose walker (supervisor) may ride in the tow vehicle when:
- 9.10.14.1. Tail walker and wing walkers are not required;
 - 9.10.14.2. Where the path to be traversed can be observed; and
 - 9.10.14.3. The actions of the cockpit brakeman and vehicle operator can be directed?
- 9.10.15. Are personnel prohibited from entering or exiting the aircraft or tow vehicle while in motion?
- 9.10.16. Is steerable landing gear set in the tow position before moving aircraft?
- 9.10.17. Are entrance doors closed, ladders retracted or removed, and landing gear down locks installed?
- 9.10.18. Does the vehicle operator stop the vehicle if he or she loses sight or communications with the tow supervisor?
- 9.10.19. Is walking between the nose wheel of the aircraft and tow vehicle prohibited?
- 9.10.20. Is towing an aircraft on or across runways and taxiways without advance approval from the tower prohibited?
- 9.10.21. Is applying aircraft brakes when aircraft is being towed prohibited?

9.10.22. Is towing aircraft with engines running prohibited?

9.10.23. Are all equipment, workstands, loose aircraft parts, and other materials removed from the vicinity of the aircraft prior to towing?

9.10.24. Are all ramps clear of snow and ice, 100 feet in front of dock doors and far enough to each side to accommodate all landing gear wheels?

9.10.25. Are sandbags and chocks used when towing or parking aircraft when ice, snow, or frost is present?

9.10.26 Are ice shocks used when needed?

9.10.27. Are heavier tow vehicles with chains used when ice or snow conditions are present?

9.10.28. Are tires inflated or deflated to provide required clearances for docks, but never exceed the minimum or maximum pressures?

9.10.29. When securing pintle assemblies and towing connections is a pintle-hook safety pin used to ensure connections stay locked?

9.11. Mooring:

9.11.1. Are all required protective plugs and covers installed on parked aircraft?

9.11.3. Is the condition of grounding points and wires checked?

9.11.4. Are all aircraft tied down during periods of high winds, and aircraft control surfaces secured? (Check for security of nose tie downs to include the nose docks.)

9.11.5. Are mooring points on the ground as close as possible to being directly under the respective mooring points of the aircraft? (Just enough slack should be allowed to prevent excessive stress on the wings and tie down rings.)

9.12. Refuel And Defuel:

9.12.1. Are all personnel familiar with the duties and responsibilities of their position?

9.12.2. Are all unnecessary personnel restricted from the fueling area?

9.12.3. Does the fueling supervisor have a complete fueling checklist?

9.12.4. Does the fueling supervisor ensure all possible sources of ignition are removed from the restricted area?

- 9.12.5. Are aircraft chocked?
- 9.12.6. Is the aircraft safe for maintenance?
- 9.12.7. Is the required number of personnel available?
- 9.12.8. Are ground power units at least 50 feet from fueling points and vents, and does the operator remain in the vicinity during the operations?
- 9.12.9. Is a spotter used if the servicing vehicle is backed into position?
- 9.12.10. Are the aircraft and servicing vehicle correctly bonded?
- 9.12.11. Is refueling accomplished 50 feet away from operating aircraft?
- 9.12.12. Is the refuel nozzle visually and physically checked for correct engagement?
- 9.12.13. When refueling, are all appropriate tank vents checked for airflow?
- 9.12.14. Are fueling operations suspended and the fire department notified of major fuel spills?
- 9.12.15. Are fire bottles serviceable per TO 00-25-172?
- 9.12.16. Are new servicing operations prohibited from starting during an in-flight emergency (IFE) without approval by the fire chief?
- 9.12.17. Are fuel servicing operations prohibited when a “lightning within 5-nm miles” advisory has been issued (refer to paragraph 4.2.)?
- 9.12.18. Do all personnel involved in the refueling process frequently ground themselves to dissipate static potential?
- 9.12.19. Is the refuel and defuel nozzle disconnected before grounding or bonding wires are removed?
- 9.12.20. Are over-the-wing hose nozzles and connectors equipped with suitable bonding cables and cannon plugs?
- 9.12.21. During over-the-wing refueling, is the nozzle bonded to the aircraft prior to removing the fuel cap, and does it remain in place until the tank cap is replaced?
- 9.12.22. Have measures been taken to ensure personnel never lock or block fuel hose nozzles in an OPEN position?

- 9.12.23. During multiple-unit servicing, does the refueling operator continuously monitor fuel-flow meters to detect any indications or reverse fuel flow?
- 9.12.24. If during multiple-unit servicing reverse flow occurs, are all operations stopped and not restarted until the causes of reverse flow are determined and corrected?
- 9.12.25. If refueling and defueling from hydrant systems, is a qualified operator stationed in the hydrant pump house of Types I and II systems during the entire operation?
- 9.12.26. Does the hose cart operator hold the remote control switch in his or her hand, starting the fuel flow only on instruction from the supervisor?
- 9.12.27. Before fuel delivery is begun, are the fuel tank caps on the aircraft checked to ensure they are secure?
- 9.12.28. On types I and II systems, does the operator ensure there is no pressure at the outlet prior to hooking up the moosehead?
- 9.12.29. Is the hose cart grounded to the hydrant outlet by a portable grounding cable?
- 9.12.30. Does the operator inspect the remote control cables to ensure they are hermetically sealed and serviceable?
- 9.12.31. Are hoses pressurized and inspected for leaks prior to the first servicing of the day?
- 9.12.32. Do hose cart operators ensure hoses are wrapped in a manner to preclude them from rubbing on the tires of the hose cart or dragging them on the pavement?
- 9.12.33. Do hose cart operators ensure all personnel involved in servicing operations are aware of the location and use of hydrant emergency shutoff switches?
- 9.12.34. Are people briefed that increased aircraft refueling will increase hazard potential?
- 9.12.35. Has verification been made of the proper fuel (JP-4 or JP-8)?
- 9.12.36. Are proper clothing restrictions observed (TO 00-25-172) for fuel servicing operations? **NOTE:** For high flashpoint fuel (example JP-8) servicing, any clothing can be worn.
- 9.12.37. Is the refueling hose stretched out and free of kinks and loops prior to commencing refueling operations?
- 9.12.38. Are radios (aircraft, vehicle, and hand-held) restricted from use within the refueling area?

9.12.39. Are fuel bladders located as far as practical from other facilities? (Sandbag these if possible.)

9.12.40. Do fuel bladders have earthen berms to contain any spillage or leaks? (Earthen berms should be capable of containing 125 percent of tank capacity.)

9.12.41. Are “No Smoking” signs posted around fuel storage areas?

9.12.42. Are fire rescue crews and vehicles needed to standby during operations according to TO 00-25-172?

9.13. Liquid Oxygen (LOX) Servicing:

9.13.1. Is oxygen serviced by fully qualified personnel?

9.13.2. Are proper servicing procedures adhered to?

9.13.3. Are all spark-producing devices eliminated from the 50-foot restricted area?

9.13.4. Is servicing documented on LOX carts?

9.13.5. Do personnel ensure no oil or grease is present on clothing, PPE, equipment, or tools when working with or around LOX?

9.13.6. Do workers ground themselves prior to beginning LOX operations?

9.13.7. Are the following worn for cryogenic handling:

9.13.7.1. Face Shield.

9.13.7.2. Leather Gloves.

9.13.7.3. Apron.

9.13.7.4. Head Covering.

9.13.7.5. Cuffless trousers and long sleeve shirt or jacket and coveralls.

9.13.7.6. Shoes which fit closely around the top with conductive rubber soles and heels.

NOTE: Personnel will wear hats that completely cover the head when they are servicing LOX with connectors above the eye level. Personnel engaged in fuel operations will have a clean change of clothes available at cryogenic storage areas in case their clothing is contaminated.

9.13.8. Are aircraft and LOX cart grounded and electrostatically bonded through filler nozzle?

9.13.9. Are flame- or spark-producing devices prohibited within 50 feet of oxygen servicing operations?

9.13.10. Is a clean drip pan underneath the overflow vent outlet and another located beneath the cart?

9.14. Technical Order (TO) Compliance:

9.14.1. Is a TO used during maintenance?

9.14.2. Are inspection workcards used during scheduled inspections?

9.14.3. Is emphasis placed on the use of technical data during all operations?

9.14.4. Are TO files adequate?

9.15. Integrated Combat Turn (ICT):

9.15.1. Is a fire truck available for the entire combat turn exercise? Are two halon fire extinguishers in position in case the fire truck has to leave the area?

9.15.2. Do all personnel remain clear of forward firing ordnance? (If electrical power is applied, personnel will not stand in front or back of loaded missiles, rockets, flare dispensers, or gun during electrical mating or after the munitions have been electrically connected.)

9.15.3. Is the aircraft grounded according to the applicable TO?

9.15.4. Are AGE or weapons trailers parked in locations that are not a hazard to taxiing aircraft? **NOTE:** Explosives-loaded weapons trailers must be parked in sited locations only.

9.15.5. Is ear protection in use?

9.15.6. Do personnel remove finger rings?

9.15.7. Is a combat turn director available as required?

9.15.8. Is an area turn supervisor available as required?

9.15.9. Is a safety briefing conducted prior to ICT start?

9.15.10. Are technical orders available and used?

9.15.11. Do supervisors monitor the work?

9.15.12. Is a communication net available?

9.15.13. Do aircraft receive a cursory inspection for leaks, hot brakes, and battle damage prior to entering the turn area?

9.15.14. Is the aircraft positioned in the direction that will present the minimum hazard to personnel and equipment in the event of an accidental firing of rockets, missiles, or gun?

9.15.15. Is good housekeeping included in the operations to keep the area clear of unnecessary tools and equipment?

9.15.16. If the aircraft engine is running, have all personnel removed their hats and secured loose items? Do all personnel use extreme caution when working near engine intake areas?

9.15.17. Do the aircrew members keep both hands in full view or is verbal communication established prior to and during arming and dearming operations, indicating hands are clear of all switches and controls?

9.15.18. If electrical power is applied, are all applicable stations electrically and mechanically safed or impulse cartridges removed?

9.15.19. Prior to handling electrically primed munitions, do personnel ground themselves so any buildup of static electricity will be dissipated?

9.15.20. Are only intrinsically-safe radios used within 10 feet of a fuel spill, an aircraft fuel vent outlet or open port outlet (when being fueled), and a truck receiving fuel, per requirements in TO 00-25-172?

9.15.21. Prior to starting operation, is the support equipment checked for serviceability and the ICT area checked to ensure it is clear of foreign objects?

9.15.22. Do crews of three carry the Air Interceptor Missiles (AIM-9)?

9.15.23. Are vehicles NOT parked or stopped in front of aircraft loaded with forward firing ordnance?

9.16. Hot Pit Refueling:

9.16.1. Do personnel have a thorough knowledge of all equipment and systems they operate?

9.16.2. Has the hot pit area been certified by the MAJCOM for hot refueling?

9.16.3. Are personnel and equipment positioned to avoid forward firing ordnance?

- 9.16.4. Are aircraft positioned to avoid existing winds blowing potential vapor or spray from the single point adapter toward the intake of an operating engine? Are aircraft positioned so jet exhaust is not directed at another aircraft on the hot refueling pad?
- 9.16.5. Are aircraft checked for hot brakes prior to entering the hot refueling pad?
- 9.16.6. Is an adequate precheck accomplished (appropriate engine shutdown, if applicable, armament pins installed, and aircraft checked for hydraulic or fuel leaks)?
- 9.16.7. Do personnel stay clear of aircraft danger areas?
- 9.16.8. Is the supervisor in clear view of the pilot and the complete refueling operation?
- 9.16.9. Is the nozzle visually and physically checked for proper engagement?
- 9.16.10. Are appropriate tank vents checked for correct airflow?
- 9.16.11. Are emergency procedures outlined in checklists?
- 9.16.12. Are the required number of personnel available?
- 9.16.13. Are two fire extinguishers available according to TO 00-25-172?
- 9.16.14. Is a fire truck on standby or modular skid-mounted or installed fire suppression equipment employing aqueous film forming foam (AFFF) on-hand?
- 9.16.15. Is appropriate fire protection support on site before hot refuel operations start?
- 9.16.16. Did the hot pad supervisor provide a safety briefing to team members on their assignment and responsibilities concerning safety, aircraft configuration, and ground conditions?
- 9.16.17. Does the hot refueling supervisor ensure the integrity of the fuel servicing safety zone (FSSZ) is not compromised?
- 9.16.18. Is a wind sock available to monitor wind direction?
- 9.16.19. Is the proper grounding and (or) bonding sequence accomplished before refuel operations?
- 9.16.20. Has the refuel equipment operator assumed a position at the refueling equipment to observe pressure gauges and immediately identify and respond to problems? Is the aircraft refueling supervisor positioned to observe the hot pad operation and to identify and respond to problems?

9.16.21. Does the hot refueling supervisor physically ensure the fuel servicing equipment outlet nozzle is connected and the deadman control valve is hand held?

9.16.22. Does the hot refueling supervisor maintain intercom contact with the pilot and hot refueling crew personnel to ensure the safety of the operation?

9.16.23. Does the fuel equipment operator immediately shutdown the equipment when a malfunction occurs?

9.17. Flight Line Explosive Operations:

9.17.1. Are weapons-loaded aircraft parked in an approved explosives parking area and are explosives limits observed?

9.17.2. Are aircraft loaded with forward firing ordnance oriented to provide minimum hazard to personnel, facilities, and off-base inhabited areas in the event of an accidental firing?

9.17.3. Are adequate controls in effect to prevent flame producing devices from being taken within 50 feet of explosives-loaded aircraft?

9.17.4. Are aircraft parking locations provided with suitable grounding points, and are explosives-loaded aircraft properly grounded prior to starting maintenance?

9.17.5. Are mechanical safing devices installed?

9.17.6. Is the aircraft properly chocked?

9.17.7. Are all pylon, bomb rack, multipiece ejector rack (MER) triple ejector rack (TER), and launcher pins installed?

9.17.8. Is fire-fighting equipment available and serviceable?

9.17.9. Did the team chief conduct a safety briefing prior to the loading operation?

9.17.10. Are torque wrenches and multi-meter calibrations up-to-date?

9.17.11. Are checklists used?

9.17.12. Are maintenance operations not permitted during loading?

9.17.13. Is the aircraft armament status recorded on AFTO Forms 781A, **Communications Security Equipment Record**, and 781H, **Aerospace Vehicle Flight Status and Maintenance Document**?

9.17.14. Does the loading crew chief sign all AFTO Form 781A entries?

9.17.15. Was the fire department notified of the aircraft status prior to and (or) during loading and downloading?

9.17.16. Are all fire control selector switches set in the SAFE and OFF position?

9.17.17. Are the armament circuit breakers pulled?

9.17.18. Is the armament master switch set to the SAFE position?

9.17.19. Are bomb release and jettison switches set in the SAFE or OFF position?

9.17.20. Have all guns been cleared manually?

9.17.21. Are personnel prohibited from wearing clothing that generates static electrical charges in violation of standards?

9.17.22. Are personnel prohibited from standing directly in front of or behind forward firing ordnance during loading and downloading?

9.17.23. Are required ammunition and explosives devices removed before moving aircraft into a maintenance hangar, per TO 11A-1-33, *Maintenance and Handling of Explosive Loaded Aircraft*?

9.18. End Of Runway (EOR) Operations:

9.18.1. Are EOR teams equipped with the required items? (Ear protection, communication cords, wands, checklists, and supervisor vest.)

9.18.2. Are arm and dearm areas located as near to the end of the runway as feasible?

9.18.3. Has each arm and dearm parking spot been marked and have taxi guidelines been painted?

9.18.4. Are all aircraft armed and dearmed in the arm and dearm area?

9.18.5. Are adequate grounding points available in the arm and dearm areas?

9.18.6. Are aircraft grounded, including those with engines running, if loading and downloading is done in the arm and dearm area?

9.18.7. Is a serviceable fire extinguisher available according to TO 00-25-172?

9.18.8. Has the senior fire fighter been contacted to determine if a fire vehicle and crew are required?

- 9.18.9. Do aircrews have their hands in plain view during all arm and dearm operations?
- 9.18.10. Has an operating instruction been published for arm and dearm operations?
- 9.18.11. Do established procedures minimize exposure to forward firing ordnance?
- 9.18.12. Does the designated arm and dearm supervisor remain in plain view of the aircraft commander and monitor and control all operations?
- 9.18.13. Are only trained and qualified personnel used for arm and dearm procedures?
- 9.18.14. Is the EOR inspection according to technical data?
- 9.18.15. Have procedures been established for ground handling of aircraft with hung ordnance and hot brakes?
- 9.18.16. Is the kit in compliance with the CTK program?
- 9.18.17. Is FOD in the arm and dearm area removed?

9.19. Aircraft Concurrent Servicing:

9.19.1. Concurrent servicing is an exception to normal procedures. The following are NEVER allowed:

- 9.19.1.1. Concurrent oxygen and petroleum servicing.
- 9.19.1.2. Concurrent fuel servicing and winching operations.
- 9.19.1.3. Maintenance on jacks during concurrent servicing.
- 9.19.1.4. Operation of electric switches.

9.19.2. Are the following requirements followed:

- 9.19.2.1. Is defueling during concurrent operations limited to single point method?
- 9.19.2.2. Is a qualified chief servicing supervisor in charge of monitoring all actions with appropriate checklists?
- 9.19.2.3. Are unnecessary personnel kept away from concurrent servicing operations?
- 9.19.2.4. Is the area posted?

9.19.2.5. Do personnel ground themselves when entering the area? (Personnel will frequently re-ground themselves during actual refueling.)

9.19.2.6. Is a halon extinguisher positioned at the nose of the aircraft?

9.20. Maintenance Stands:

9.20.1. Guard rails must be installed and personnel will not be permitted to stand on the rails.

9.20.2. Stands must be in a good state of repair, clean, free of oil and grease, and clear of foreign objects.

9.20.3. At least two wheels must be locked when a maintenance stand is in use or unattended.

9.20.4. When in use, the pressure relief handle must be in the closed position. Weight limit for a maintenance stand is 500 pounds maximum or as labeled.

9.20.5. Maintenance equipment and work stands not actually required for work in progress will be removed from the parking area to suitable storage locations and cabled.

9.20.6. All locking devices and safety pins must be utilized when a platform is raised.

9.21. Flight Line Vehicle Operations:

9.21.1. Vehicle inspection sheets will be signed off daily before use.

9.21.2. All vehicle operators will be licensed with proper authorization to drive on the flight line and perform required tasks.

9.21.3. Vehicle pintle hooks will be serviceable, properly used, and closed and pinned when not in use.

9.21.4. Seatbelts will be used whenever the vehicle is in motion.

9.21.5. Tires will be checked for FOD before entering the flight line unless driven over an approved FOD shaker.

9.21.6. The following speed limits will be observed:

9.21.6.1. General Purpose Vehicles 15 mph

9.21.6.2. Special Purpose Vehicles 10 mph

9.21.6.3. Operating in proximity to aircraft 5 mph

9.21.6.4. Aircraft towing speed (not to exceed walking team members) 5 mph

9.21.6.5. Towing Power Units:

9.21.6.5.1. Single Units 15 mph

9.21.6.5.2. Tandem Units 10 mph

9.21.7. Are the requirements listed below followed:

9.21.7.1. Are observers used as required when backing vehicles?

9.21.7.2. Are runway “hold short” lines observed by drivers?

9.21.7.3. Do security forces personnel periodically monitor vehicle traffic?

9.21.7.4. Do vehicle operators avoid using the ramp as a shortcut to other places on the airdrome?

9.21.7.5. Are all passengers properly seated while the vehicle is in motion? (When riding in the bed of a military vehicle, passengers must be seated on the floor of the bed—NOT the sides and NOT the wheel wells, nor against the tail gate.)

9.21.7.6. Are chocks in place and a spotter used when backing fuel trucks around the aircraft?

9.21.7.7. Do all vehicle operators drive over FOD shakers or stop and check their tires for FOD prior to entering flight line areas?

9.21.7.8. Do all vehicles, except responding emergency vehicles, yield to taxiing aircraft and (or) munitions-loaded vehicles?

9.21.7.9. Are vehicles prevented from stopping in front of aircraft loaded or being loaded with forward firing ordnance?

9.21.7.10. Do vehicle operators maintain communications with tower in the radio controlled area?

9.21.7.11. Do flight line vehicles have a control tower lights placard posted in plain view of the vehicle operator?

9.21.7.12. At night, do drivers turn off headlights when taxiing aircraft are approaching?

9.21.7.13. At night, when vehicles are parked unattended, are parking lights or emergency flashers turned on?

9.21.7.14. Are operators of special purpose vehicles thoroughly trained and certified?

9.21.7.15. Do unattended vehicles have ignition off, key in lock, and wheels chocked if within 10 feet of an aircraft?

9.21.7.16. Are personnel prevented from sitting or laying on the ramp in the flow of vehicle traffic?

9.21.7.17. Are the taxi lines on the ramp used as the median for vehicle operations whenever possible?

9.21.7.18. Do workers use the proper procedure for getting into or out of the bed of a military vehicle? (The operator will put the tailgate down, have passengers load or unload, and then close the tailgate. Personnel will NOT jump in or out over the side or tailgate.)

9.21.7.19. If an aircraft has any engines running, do vehicle operators know not to drive or park a vehicle on the taxi lane behind that aircraft? (Minimum clearance behind the aircraft is 200 feet)

9.22. Driving Near Aircraft:

9.22.1. DO:

9.22.1.1. Approach parked aircraft with the driver's side toward the aircraft.

9.22.1.2. Park vehicles so they can depart going forward—away from the aircraft.

9.22.1.3. Park vehicles in a way that eliminates the possibility of striking the aircraft if the vehicle inadvertently rolls forward or backward.

9.22.1.4. Park all vehicles with:

9.22.1.4.1. Chocks installed;

9.22.1.4.2. Ignition turned off;

9.22.1.4.3. Parking brake set;

9.22.1.4.4. Key in the lock; and

9.22.1.4.5. Transmission in reverse or park.

9.22.1.5. Use emergency flashers or parking lights, if flashers are not installed, when parked during the hours of darkness or inclement weather. Operators will take special care to assure vehicle battery will not be consumed. (Jumper cables should be readily available.)

9.22.1.6. Chock special purpose vehicles (SPV) when engines must be left running while the operator leaves the vehicle to operate equipment (i.e., baggage conveyors).

9.22.1.7. Chock aircraft ground equipment (AGE) if positive braking action is not functioning on a minimum of two wheels.

9.22.1.8. When SPV must operate under any portion of the aircraft:

9.22.1.8.1. Stop at least 10 feet from the aircraft.

9.22.1.8.2. Have the guide set the chocks.

9.22.1.8.3. Verify the overhead clearance.

9.22.1.8.4. Pre-position the chocks.

9.22.1.8.5. Proceed with caution.

9.22.1.8.6. Remove the pre-positioned chocks only after the SPV has departed 10 feet from the aircraft.

9.22.2. DON'T:

9.22.2.1. Operate a vehicle closer than necessary unless it is absolutely essential for mission accomplishment—in which case proceed with extreme caution and use a minimum of one guide.

9.22.2.2. Leave vehicles unattended with engine running.

9.22.2.3. Drive or tow equipment between aircraft unless there is adequate clearance between the aircraft's wingtips.

9.22.2.4. Drive SPVs under the wing of an aircraft unless required by TO to accomplish servicing.

9.22.2.5. Drive vehicles under any part of the aircraft.

9.23. Aircraft Operations—Flight Crew:

9.23.1. Use of butane lighters on or around the aircraft is prohibited.

- 9.23.2. All baggage, life support equipment, chocks, etc., must be secured.
- 9.23.3. Scarves and rings will be removed prior to performing duties around the aircraft.
- 9.23.4. Gloves will be worn during cargo handling, takeoff, and landing.
- 9.23.5. Crew members performing flying duties will not wear nylon web (jungle) boots.

9.24. Engine Running Onloads And Offloads:

- 9.24.1. All personnel will be properly briefed prior to the start of the operation.
- 9.24.2. Personnel will not stand directly behind cargo being off-loaded.
- 9.24.3. Hearing protection will be worn.
- 9.24.4. Passengers and equipment will be kept away from the prop areas.
- 9.24.5. Maximum lighting will be utilized during night operations.
- 9.24.6. Reflective gear and lighted wand will be used during night operations.
- 9.24.7. Personnel will wear goggles when operations are off a hard surface.
- 9.24.8. The load team will not approach the aircraft until all engines are in ground idle or reverse thrust. Vehicle operators will, under the direction of the load team chief, position the load a minimum of 25 feet aft and slightly to the right of the aircraft fuselage, leaving a clear 15-foot wide path behind the aircraft.
- 9.24.9. The team chief will be in a position clearly visible to vehicle drivers when acting as the ground vehicle director.
- 9.24.10. Deplaning troops will be instructed to proceed a minimum of 50 feet aft of the aircraft before turning right or left and will continue laterally a minimum of 300 feet before stopping.
- 9.24.11. Only one piece of loading equipment will be directed to approach the aircraft at any one time.
- 9.24.12. Sufficient fire protection will be available per requirements in TO 00-25-172.

9.25. Taxiing:

- 9.25.1. Speed should approximate a brisk walk not to exceed 10 mph.

9.25.2. Aircraft will not be taxied within 25 feet of an obstacle without a marshaler, and aircraft will never be taxied closer than 10 feet of an obstacle.

9.25.3. Aircraft will not be backed within 25 feet of an obstacle. Aircraft wings or tail will not pass over obstacles.

9.25.4. During the day, two marshaling paddles will be used by the marshaler; at night, two illuminated wands will be used. Marshalers must remain visible to the left seat pilot at all times.

9.25.5. While backing, no one will stand on or dangle feet from the aft ramp.

9.25.6. Spotters will be used in the flight deck windows whenever possible.

9.25.7. Wing-tip clearance guards will also use two light wands during night operations.

9.25.8. Are the following rules adhered to:

9.25.8.1. Are flight engineers allowed to start, run, warm-up, and test helicopters only when the rotors are not engaged?

9.25.8.2. Are aircraft not taxied closer than 100 feet of an active runway where aircraft are operating, unless they are taxiing on an established taxiway?

9.25.8.3. Are wing walkers used when taxiing within 25 feet of an obstruction?

9.25.8.4. Are aircraft never taxied in excess of 10 mph in congested areas?

9.26. Engine Run-Ups:

9.26.1. For specific aircraft engine-run guidance refer to the aircraft TO and local directives.

9.26.2. Person on flight deck will monitor ground control and guard (if applicable).

9.26.3. Ensure proper chock placement. (Example: Chocks—4 minimum—are placed forward and aft of the forward main gear tires on C-130 aircraft [Left and right]).

9.26.4. No vehicles or equipment will be in front of the aircraft.

9.26.5. For engine runs above idle, ensure the aircraft is clear from behind.

9.26.6. Place flaps in the up position.

9.26.7. If it is necessary to run at power settings other than ground idle, make sure no aircraft is parked directly behind or directly in front of the aircraft.

9.26.8. The person supervising the run (usually the left seat operator) must physically check behind the run-up and all associated danger areas to ensure clearance.

9.26.9. Turn external aircraft lighting on.

9.26.10. All personnel will possess and use applicable checklists.

9.26.11. Consider the following:

9.26.11.1. Are personnel prohibited from positioning themselves between the aircraft and the cargo and (or) material handling equipment when on- or off-loading cargo?

9.26.11.2. Are pre-positioned chocks used effectively to ensure load vehicles do not contact aircraft surfaces?

9.26.11.3. Are K-loaders prevented from being driven with the bed in the raised position?

9.26.11.4. Are only minor bed adjustments made when the K-loader is positioned at the aircraft to facilitate smooth transition of cargo during on-loading or off-loading operations?

9.26.11.5. Do K-loader operators not raise, lower, or make any bed adjustments when personnel are on the bed?

9.26.11.6. Is all cargo adequately secured to material handling equipment (MHE) prior to movement of the MHE in any direction?

9.26.11.7. Do load team members and block-in and -out crews utilize luminous wands when marshaling during the hours of darkness?

9.26.11.8. Are personnel prohibited from crossing over the aircraft winch cable when it is in operation?

9.26.11.9. Are personnel told not to approach aircraft during engine running on-load and off-load (ERO) until the thrust reversers (T/R) are open?

9.26.11.10. When approaching an aircraft during an ERO, do personnel position themselves at least 50 feet to the rear of the aircraft, move in a straight line to the taxi line, and turn and move towards the aircraft down the taxi line? (The reverse must be followed when leaving the aircraft after completion of an ERO. At no time will personnel expose themselves or cargo to aircraft jet blasts.)

9.26.11.11. Are approved ear protector headsets (Mickey Mouse Ears) worn during ERO operations?

9.26.11.12. Are goggles worn during EROs on unprepared surfaces or when there is a danger of blowing debris?

9.26.11.13. Is the senior fire fighter contacted to determine if a fire vehicle and crew is required?

9.27. Marshaling:

9.27.1. Does the cargo checkpoint have the following items on hand:

9.27.1.1. A list of personnel authorized to sign Shippers Declaration for Dangerous Goods?

9.27.1.2. Unit listing of all hazardous cargo?

9.27.2. Is sufficient lighting available?

9.27.3. Is a 5 mph speed limit posted in the marshaling area?

9.27.4. Is the 5 mph speed limit followed?

9.27.5. Is jewelry removed?

9.27.6. Are vehicles chocked?

9.27.7. Are leather gloves worn when handling equipment?

9.27.8. Are spotters used and chocks pre-positioned when vehicles are backing, especially when backing toward an approaching aircraft?

9.27.9. Is ear protection worn on the flight line—either ear plugs, ear defenders, or both?

9.27.10. Are personnel not allowed to stand in front of equipment when loading aircraft?

9.27.11. Do marshaling yard personnel ensure all dunnage being shipped with cargo is adequately secured for flight?

9.27.12. Are personnel prevented from jumping from maintenance stands and aircraft?

9.27.13. Are personnel not allowed to stand on maintenance stand guard-rails?

9.27.14. Are personnel prevented from walking in front of moving aircraft or vehicles?

9.27.15. Are personnel prevented from lying or sleeping on the ramp at night?

9.27.16. Are safety cables and safety harnesses with snapping devices worn when performing maintenance on exterior surface of aircraft which are over 10 feet off the ground?

9.27.17. Are safety harnesses inspected prior to use?

9.27.18. When walking or working on aircraft in hangars, nose docks, shelters, etc., where a worker can fall 10 feet or more, is fall protection used?

9.28. Deicing:

9.28.1. Are aircraft deiced in the following manner:

9.28.1.1. No deicing is performed while engines and (or) auxiliary power units are running?

9.28.1.2. All doors, hatches, and canopies are secured prior to deicing operations?

9.28.1.3. Deicing fluid is not used to remove heavy accumulations of snow? (The snow absorbs the fluid and forms a slush which is very difficult to remove. After snow is removed from the aircraft, a layer of rough ice remains which can be quickly dispatched with deicing fluid.)

9.28.1.4. Since deicing fluid is mildly toxic, are persons near the aircraft when it is being deiced placed upwind (as much as possible) of the application area?

9.28.1.5. Before snow or ice removal from the empennage of the aircraft, are the stabilizers placed in the up position and the elevators in the down position? (If possible, the stabilizer and elevator should remain in this position for approximately 12.5 minutes to permit the draining of fluids from the surface.)

9.28.1.6. As much as possible, is the deice truck placed in position to remove ice from the leading edge first?

9.28.1.7. Is the spray of deicing fluid directed onto surfaces to be cleaned? Are the following actions taken?

9.28.1.7.1. Do not direct the melted ice, snow, or slush into balance bays and do not allow stream to enter balance bays or be applied directly to honeycomb surfaces.

9.28.1.7.2. Ensure balance bays are clear of accumulated snow and ice.

9.28.1.8. When deicing is complete, is the deicing rig moved into position in order to grasp the trailing edge of each control surface and move it by hand through full travel to ensure freedom of movement?

9.28.2. Is the aircraft canopy and windshield cleaned before taxiing?

9.29. Aircraft Hangar, Shelter, And Nose Dock Operations:

9.29.1. Because working space is limited in hangars, the potential for tripping and falling over power cords, compressed airlines, and parts is ever present. Is the hangar cleared, as much as possible, of these hazards?

9.29.2. Many tasks require manual lifting, some in awkward positions that can be stressful to body parts. Are proper lifting techniques used and, when possible, help given to accomplish the task?

9.29.3. Walking, backing, or bumping into aircraft, workstands, or equipment poses a potential for injury. Do supervisors help keep a watch for workers and call out to them when necessary?

9.29.4. Do hangar doors operate properly, with working audible warning?

9.29.5. Do individuals take responsibility to clean up the tools and equipment they have used and ensure tripping hazards are eliminated from work areas?

9.29.6. Are aircraft panels, cowlings, and other parts relocated to storage areas when not in use?

9.29.7. Are electrical cords and compressed air lines placed in storage areas when not in use?

Chapter 10

VEHICLE OPERATIONS

10.1. Built-Up Areas and Local Driving. Mishap experience shows local drivers, especially in some overseas locations, to be very unpredictable, often showing complete disregard of traffic signs and signals, turning left from the right lane or vice versa, and making U-turns in intersections. Local weather conditions can also affect driving. Therefore, supervisors should:

10.1.1. Provide instruction in local driving customs and practices.

10.1.2. Encourage deployment drivers to avoid areas of high civilian-vehicle concentration.

10.1.3. Ensure all drivers are aware of flash-flood dangers: frequency of rainstorms, low areas, and the effect on roads and traffic.

10.1.4. Establish and enforce safe speed limits for various road and environmental conditions.

10.1.5. Enforce the requirement to use safety belts (driver and all passengers).

10.1.6. Pair an experienced driver with an inexperienced one to provide supervision and hands-on training.

10.1.7. Identify personnel who are not licensed to operate vehicles and ensure they are not tasked to drive.

10.1.8. Instruct drivers on conditions that can lead to rollovers—steep slopes, ditches, loose sand, etc.

10.1.9. Ensure equipment is secure to prevent injury from falling equipment or cargo.

10.1.10. Remind drivers to slow down in limited visibility, on rough terrain, and during inclement weather.

10.1.11. Caution drivers to avoid steep slopes and narrow trails (leaders must also keep this in mind when planning vehicle moves).

10.1.12. Remind drivers to give special care to tire, track, and suspension checks.

10.1.13. Caution drivers to drive at moderate speed and make wide turns at slow speed to maintain vehicle control (especially critical in sand).

10.1.14. To avoid rear-end collisions:

10.1.14.1. Stress safe following distances.

10.1.14.2. Establish procedures for vehicle stops and breakdowns to warn approaching vehicles in blackout, sand-storms, and other restricted-visibility conditions.

10.2. Vehicle Operations Checklist:

10.2.1. When chemical gear is worn, do drivers train in a low risk area such as an empty parking lot until the vehicle can be operated safely?

10.2.2. Do operators increase safety awareness and operate vehicles at slower speeds when wearing chemical gear?

10.2.3. Are drivers and ground guides trained for night operations?

10.2.4. Are drivers in proper physical and mental condition to operate a vehicle?

10.2.5. Are the operator and senior ranking passenger aware of their responsibility to ensure all passengers are buckled up? (Buckling up is everyone's responsibility!)

10.2.6. Has the pre-operational check (AF Form 1800, **Operator's Inspection Guide and Trouble Report [General Purpose Vehicles]**) been performed to ensure the vehicle can operate safely?

10.2.7. Do supervisors correct unsafe handling or excessive risk-taking in vehicles?

10.2.8. Is a spotter used when backing a vehicle if the vehicle operator's vision is obstructed?

10.2.9. Is 25 mph or 40 kph speed limit observed on base, unless otherwise posted?

10.2.10. Is speed reduced in congested areas?

10.2.11. Do vehicles stop when approaching a bus on- and off-loading passengers?

10.2.12. Are vehicles winterized to include checking exhaust for leaks, antifreeze levels, heater, and defroster?

10.2.13. Are engines turned off in unmanned vehicles?

10.2.14. Do security force vehicles periodically monitor vehicle traffic?

10.2.15. Does the pre-op check for track vehicles include: fuel connections, electrical wiring, antenna tie down, fire extinguisher, and discharge line connections?

10.2.16. If vehicle occupants remain in parked, running vehicles for prolonged periods of time, do they ensure ventilation is adequate?

- 10.2.17. Do personnel with backpack radios or vehicle field antennas ensure clearance between antennas and overhead lines?
- 10.2.18. Do operators stop at all crosswalks if pedestrians are present?
- 10.2.19. Are inside panel lights dimmed at night to reduce glare?
- 10.2.20. Are directional signals used well in advance?
- 10.2.21. Are vehicles operated for conditions, not necessarily speed limits?
- 10.2.22. Does the operator know load weight limits for vehicles carrying cargo?
- 10.2.23. Are all seat belts in the cab of the vehicle filled prior to allowing passengers in the truck bed?
- 10.2.24. Do passengers in the back of vehicles sit on the bed, not on the wheel wells or tail gate—and do not stand up?
- 10.2.25. Do riders sit as far forward (toward the cab) as practical?
- 10.2.26. Is the tailgate closed, with no one sitting on it or leaning against it?
- 10.2.27. Are passengers in the back of small pickups (smaller than those seen in the US) limited to two and ride with their backs up against the cab?
- 10.2.28. Are drivers briefed on terrain changes if traveling off the roadway?
- 10.2.29. Are roadway condition codes, if used, observed? (GREEN = good, AMBER = exercise caution, RED = only emergency vehicles, and BLACK = roads are impassable.)
- 10.2.30. If carrying cargo, is it secured and does not obstruct vision from inside the cab?
- 10.2.31. Are proper following distances followed, especially in any convoy?
- 10.2.32. Are emergency procedures known should the vehicle break down?
- 10.2.33. Are proper hand signals used if ground guiding so the driver knows who is giving the signals and what the signals mean?
- 10.2.34. Do ground guides keep out of the vehicle's path (or stay at least 10 yards away) when the vehicle is moving?

- 10.2.35. Do ground guides keep in sight of the driver? (Never turn your back on a moving vehicle.)
- 10.2.36. Does the operator stop the vehicle if the guide cannot be seen or if the signal is not clear?
- 10.2.37. Is there a pre-plan to help prevent night ground guide mishaps?
- 10.2.38. Are vehicle operators adequately rested?
- 10.2.39. Are headlights used during rain and fog as well as dusk to dawn? (No high beams in fog.)
- 10.2.40. Are passengers seated while the vehicle is in motion?
- 10.2.41. Is there an ice scraper in the vehicle?
- 10.2.42. Do operators ensure deicing fluid is not sprayed, due to toxicity, with the heater or defroster operating?
- 10.2.43. Are operators of special purpose vehicles thoroughly trained and (or) certified as appropriate?
- 10.2.44. Are riders prohibited from sitting on unsecured objects or equipment in the truck bed?
- 10.2.45. Are riders prohibited from sharing the truck bed with any top-heavy objects or equipment which could shift and injure them?
- 10.2.46. Is the driver's vision blocked by passengers in the bed? (If so, the use of side mirrors is highly recommended.)
- 10.2.47. Do you ensure vehicles are not driven between aircraft parked on adjacent spots?
- 10.2.48. When vehicles are parked with the driver's side to the aircraft, are they located clear of the wing tip in a position clearly visible to personnel in the cockpit?
- 10.2.49. Do you ensure, except for "FOLLOW ME" guides, vehicles will not be driven into the path of a taxiing aircraft? (Vehicles will not be driven between aircraft and the "FOLLOW ME" guide.)
- 10.2.50. When vehicles re-enter paved surface area after having driven on any unpaved area on the flight line, does the driver stop and visually inspect and clean tires of any foreign objects?
- 10.2.51. Do vehicle operators give immediate right-of-way to approaching aircraft and emergency vehicles? (During marshaling, vehicles, support equipment, and support personnel,

exclusive of essential block-in personnel, will remain clear and stationary until the aircraft chocks are in place before approaching the aircraft.)

10.2.52. Do you ensure under no circumstances will personnel ride or walk between the nose of an aircraft and its towing vehicle nor will they board or leave a moving aircraft or towing vehicle?

10.2.53. Are headlights shining toward aircraft switched to parking lights until the aircraft is out of range?

10.2.54. Do vehicles approach parked aircraft with the driver's side towards the aircraft? Are they not, except in emergencies, parked or driven closer than 25 feet in front, or 200 feet to the rear of any aircraft with engines running?

10.2.55. If operators wear night vision goggles, are they thoroughly trained?

Chapter 11

WEAPONS

11.1. Ammunition and Explosives:

11.1.1. General Precautions:

11.1.1.1. Expose only the minimum number of people and amount of equipment necessary to ammunition and explosives.

11.1.1.2. Handle ammunition carefully. Containers must not be tumbled, dropped, thrown, rolled, or dragged (unless designed for dragging).

11.1.1.3. Make provisions to evaluate and, if necessary, segregate damaged ammunition.

11.1.1.4. Caution personnel not to disassemble or destroy enemy equipment or ammunition without authorization. Unknown ammunition stocks should be carefully examined by ordnance experts before demolition or shipment.

11.1.1.5. Ensure personnel wash clothing with an antistatic (fabric softener) additive to reduce static electricity.

11.1.1.6. Do not use sparking metallic tools on explosives; take precautions to reduce static-electricity discharge.

11.1.1.7. Determine if the area of operations is susceptible to electrical storms and establish lightning-protection procedures.

11.1.1.8. Monitor suspension and restriction notices. Suspended lots should be visibly marked and physically separated from serviceable load.

11.1.1.9. Ensure personnel know not to remove ammunition from its packaging until they have to. Ammunition containers provide protection from hazards such as moisture and static electricity.

11.1.1.10. Wear leather gloves when working with banding materials or wooden boxes.

11.1.1.11. Keep the area within 50 feet of ammunition clear of vegetation, refuse, empty packing materials, and other hazards that could cause a fire to spread to the ammunition.

11.1.1.12. Keep water barrels or tubs at locations where white phosphorus (WP) or powered white phosphorus (PWP) ammunition is kept. These barrels and tubs are used to immerse leaking WP or PWP round and for first-aid for WP or PWP burns.

11.1.1.13. Store ammunition in dugouts or depressions below ground level to reduce exposure to heat.

11.1.2. Unexploded Ordnance (UXO):

11.1.2.1. Remind personnel not to touch, pick up, attempt to disarm, or otherwise disturb any UXO, dud ordnance, or any unknown object they might come across. Tell them to mark the location to warn others and report it immediately to the Explosive Ordnance Division (EOD) through their chain of command.

11.1.2.2. Do not allow personnel to collect duds for souvenirs.

11.1.2.3. Notify adjacent units prior to EOD destroying UXO to avoid transmission of false alarms. Remind personnel to:

11.1.2.3.1. Make any radio transmission at least 100 meters away from a UXO hazard.

11.1.2.3.2. Not move toward suspected UXO. Some types have magnetic or motion-sensitive fuses and will detonate when they detect a target. Other types have self-destruct timers.

11.1.3. Fire Precautions:

11.1.3.1. Keep all flammable materials and all flame- or spark-producing devices away from ammunition and explosives. This includes matches, lighted cigarettes, petroleum products, and vehicles with leaking fluids.

11.1.3.2. Ensure fire extinguishers are present whenever ammunition is handled, stored, or transported.

11.1.4. Loading Precautions:

11.1.4.1. Ensure vehicle brakes are set, engine is turned off, and at least one wheel is chocked during loading and unloading.

11.1.4.2. Ensure ammunition weight is evenly distributed and the load is secured to prevent movement.

11.1.4.3. Ensure vehicles and trailers loaded with ammunition are parked at least 50 feet from vehicles and trailers loaded with flammable liquids.

11.1.5. Storage Precautions:

11.1.5.1. Protect ammunition, particularly unpackaged ammunition, from direct sun. However, tarpaulins or other covers placed directly on ammunition can cause deterioration, so a ventilation space must be provided.

11.1.5.2. Disperse ammunition to minimize loss in the event of fire, accidental explosion, or enemy action.

11.1.5.3. Conform to quantity-distance standards for storage of ammunition and explosives.

11.1.5.4. Ensure that captured ammunition and ammunition of unknown origin is examined, evaluated, and classified by qualified personnel and stored in a designated collection point.

11.1.5.5. When storing ammunition, use sand dunes, barriers, buildings, and so forth to prevent propagation and to protect personnel and material from the effects of an explosion.

11.1.6. Pyrotechnics:

11.1.6.1. Ensure personnel know that simulator flash powder ignites instantly and explosively and that simulators should not be exposed to intense heat and direct sunlight. Remind personnel never to cut open or hand-ignite these devices and to mark duds and seek EOD guidance for handling and disposal.

11.1.6.2. Remind personnel, while training, not to throw or detonate simulators, flares, or smoke devices near troops, tents, vehicles, or other flammable or combustible materials.

11.1.6.3. Remind personnel to roll down sleeves and wear gloves and helmets when using simulators.

11.1.7. Small Arms Handling:

11.1.7.1. General:

11.1.7.1.1. Construct “clearing barrels” at first-aid stations, mess tents, and other appropriate areas. Enforce proper clearing procedures before entry.

11.1.7.1.2. Ensure fields of fire at guard points do not fall into friendly positions.

11.1.7.1.3. Ensure Special Forces and AF personnel are proficient in combat identification and rules of engagement.

11.1.7.2. Maintenance:

11.1.7.2.1. Establish weapons lubrication policy.

11.1.7.2.2. Require that weapons, ammunition, and magazines are kept clean.

11.1.7.2.3. Require that muzzles be covered to prevent clogging.

11.2. Weapons Checklist:

11.2.1. Are explosive storage facilities located where they expose the least number of personnel and resources?

11.2.2. Has AF Form 2047, **Explosives Facility License**, been issued where applicable?

11.2.3. Does the proposed munitions storage facility meet security requirements of AFMAN 91-201, paragraph 2.35.?

11.2.4. Unless otherwise directed by the fire chief, are a minimum of two fire serviceable extinguishers, suitable for the hazards involved, provided for immediate use at any location where explosives are handled?

11.2.5. Are all fire control selector switches set in the SAFE and OFF position?

11.2.6. Are the armament circuit breakers pulled?

11.2.7. Are mechanical safing devices installed?

11.2.8. Is the armament master switch set to the SAFE position?

11.2.9. Are bomb release and jettison switches set in the SAFE or OFF position?

11.2.10. Have all guns been cleared manually?

11.2.11. Is the aircraft properly chocked?

11.2.12. Is fire-fighting equipment available and serviceable?

11.2.13. Did the team chief conduct a safety briefing prior to the loading operation?

11.2.14. Are maintenance operations prohibited during loading?

11.2.15. Are personnel prohibited from wearing clothing that generates static electrical charges in violation of standards?

11.2.16. Is the aircraft armament status recorded on AFTO Forms 781A and H?

11.2.17. Does the loading crew chief sign all AFTO Form 781A entries?

11.2.18. Was the fire department notified of the aircraft status after loading and downloading?

11.2.19. Are local written procedures available for all phases of munitions operations?

11.2.20. Is procedural information provided by the host unit to include:

11.2.20.1. A copy of all applicable joint-use and sole-use facilities with net explosive weight (NEW) limits and other special provisions;

11.2.20.2. Climatic conditions;

11.2.20.3. Local regulations that may affect the deployed unit's operations;

11.2.20.4. Aerial photos, if available; and

11.2.20.5. A current and future (if applicable) base explosives location map.

11.2.21. Has the weapons safety representative reviewed the OPLAN requirements?

11.2.22. Did weapons safety personnel participate in pre-deployment site surveys?

11.2.23. Are locations designated and sited for storage, buildup, and munitions loading operations?

11.2.24. Do plans address pertinent explosives safety information of all explosives operations and locations required for the contingency tasking?

11.2.25. Are high interest area inspections accomplished at locations or operations where major potential has been identified by inspections or mishap investigations:

11.2.25.1. Arm and dearm operations.

11.2.25.2. All missile operations.

11.2.25.3. Preload facilities and operations.

11.2.25.4. Combat turnaround operations.

11.2.25.5. Compliance with locally administered imposed restrictions to explosives operations.

11.2.26. Are spot inspections conducted on all explosives operations and locations including the following high-interest areas? **NOTE:** Spot inspections must include operations at other than normal duty hours (i.e., night operations).

11.2.26.1. Maintenance, storage, alert, and operating locations.

- 11.2.26.2. Flight line explosive operations.
- 11.2.26.3. Weapons maintenance activities.
- 11.2.26.4. Licensed locations (i.e., egress, life support, and armament shops).
- 11.2.27. Are follow-up inspections conducted to ensure corrective actions are adequate?
- 11.2.28. Are smoking areas properly identified by an approval letter from the fire chief:
 - 11.2.28.1. Are suitable receptacles available?
 - 11.2.28.2. Are “No Smoking” signs posted where required?
 - 11.2.28.3. Is a serviceable fire extinguisher available?
- 11.2.29. Are the following considered for Licensed Explosives Facilities:
 - 11.2.29.1. Are the proper fire and hazard symbols posted on the entrance to the licensed facility?
 - 11.2.29.2. Is the fire department notified of the current symbols?
 - 11.2.29.3. Is the current approved explosives license posted?
 - 11.2.29.4. Are only the type and quality of explosives authorized on the license present?
 - 11.2.29.5. Are explosives properly stored in their approved Department of Transportation (DOT) containers and do they comply with environmental limitation (ventilation, direct sunlight, moisture)?
 - 11.2.29.6. Are the required extinguishers identified on the license available and serviceable?
 - 11.2.29.7. Are the personnel limits posted and adhered to?
 - 11.2.29.8. Are unserviceable items adequately segregated and identified?
 - 11.2.29.9. Does housekeeping provide a safe environment?
 - 11.2.29.10. Is security of munitions adequate?
 - 11.2.29.11. If a storage locker is used, is it used only for the storage of explosives?
 - 11.2.29.12. Is the required protective equipment available for individuals performing operations involving chemical munitions?

11.2.29.13. Is no more than 100 pounds net explosive weight (NEW) class/division 1.3 and no more than 50 pounds NEW class/division (04) 1.2 stored, and when combined no more than 100 pounds NEW total of which no more than 50 pounds can be (04) 1.2?

11.2.29.14. If class/division (04) 1.2 items are stored inside, are they properly barricaded (one-fourth inch mild steel or sand bags totally enclosing the item)?

11.2.30. Are the following considered for Arm And Dearm Areas:

11.2.30.1. Has an area been designated for the safe arming and dearming of aircraft?

11.2.30.2. Do parked aircraft face clear areas during arming and dearming operations?

11.2.30.3. Are arm and dearm personnel qualified according to local directives?

11.2.30.4. Are published operating instructions prepared for ground handling of aircraft with hung ordnance?

11.2.30.5. Are wheels chocked prior to commencing arm and dearm operations?

11.2.30.6. Do aircrews have their hands visible to ground personnel during all arming and dearming operations?

11.2.30.7. Are bomb dispensers, and rocket launchers checked in the arm and dearm area for unexpended ordnance?

11.2.30.8. Is sufficient fire protection available as outlined in TO 00-25-172?

11.2.31. Are the following considered for transportation of explosives:

11.2.31.1. Are tie-down procedures in use?

11.2.31.2. Are the appropriate placards in use?

11.2.31.3. Is the vehicle checked for serviceability?

11.2.31.4. Are the appropriate fire extinguishers serviceable and available?

11.2.31.5. Is the emergency procedures checklist available and in use?

11.2.31.6. Are vehicle operators carefully selected, adequately trained and tested, and properly informed of the explosives hazards involved?

- 11.2.31.7. Have the primary and alternate explosives movement routes been identified and used?
- 11.2.31.8. Is gasoline-powered equipment equipped with back-fire deflectors securely attached to the throat of the carburetor and of the oil-bath screen type?
- 11.2.31.9. Are all electrical connections securely fastened to prevent accidental disconnection?
- 11.2.31.10. Is gasoline- or diesel-powered equipment parked outside explosives storage buildings and (or) sites when not in use?
- 11.2.31.11. Are vehicles chocked, hand brakes set, engine turned off, and transmission placed in the lowest forward gear when unattended and during load and download operations?
- 11.2.31.12. Are all refueling operations conducted at least 100 feet from explosives locations prior to loading?
- 11.2.31.13. Are personnel NEVER allowed to ride on or in the cargo portion or compartment of motor vehicle transporting explosives?
- 11.2.31.14. Is smoking prohibited within 50 feet of an explosives-loaded vehicle?
- 11.2.32. Are the following considered for explosives holding areas:
- 11.2.32.1. Is the area enclosed by rope or some other means to prevent unauthorized traffic from entering the area?
- 11.2.32.2. If the area is used at night, is it clearly identified by reflectorized materials?
- 11.2.32.3. Are appropriate fire and hazard symbols posted?
- 11.2.32.4. Was the fire department notified?
- 11.2.32.5. Is the area free of combustible materials?
- 11.2.32.6. Are fire extinguishers immediately available and suitable for the hazards involved?
- 11.2.32.7. Are water barrels and a safety kit available where WP munitions are stored?
- 11.2.32.8. Are the brakes set on vehicles and trailers loaded with explosives, except during freezing weather, and is one wheel chocked?

11.2.33. Are the following considered for other areas:

11.2.33.1. Are mobility plans and site plans for deployed locations concerning explosives operations (hot cargo pad, onload and offload locations, transit storage, and armories) reviewed and approved?

11.2.33.2. Have procedures been established so emergency response units (fire and crash rescue) are notified of inbound and outbound hazardous cargo?

11.2.33.3. Have procedures been developed to notify the Fire Department when explosives loading and unloading occurs?

11.2.33.4. Have procedures been established for suspension of explosives operations when an electrical storm is within 5-nm miles? ([Refer to paragraph 4.2.](#))

11.2.33.5. Are operators of explosives-laden motor vehicles and MHE explosives trained?

11.2.33.6. Do MHE (K-loaders) have one serviceable class 2A:10BC-rated fire extinguisher?

11.2.33.7. Are fire symbols displayed on sides, front, and rear of vehicles and MHE transporting explosives?

11.2.33.8. Are explosives properly secured to MHE and vehicles to prevent movement?

11.2.33.9. Are fire symbols posted at aircraft? (**NOTE:** Fire symbols should be placed at nose, tail, and sides of aircraft, unless the entire CAPA is posted.)

11.2.33.10. Are serviceable flight line fire extinguishers available and readily accessible at each explosives loaded aircraft?

11.2.33.11. Is smoking prohibited within 50 feet of explosives at all times?

11.2.33.12. Is aircraft refueling prohibited during explosives loading and unloading? (**NOTE:** Motor vehicles and MHE transporting explosives should remain 100 feet away during refueling.)

11.2.33.13. Are aircraft engines stopped before loading and offloading of explosives? (**NOTE:** ERO procedures are not approved unless authorized in exercise operations order or contingency air tasking order.)

11.2.33.14. Are troop commanders and loadmasters knowledgeable of individual issue ammunition restrictions?

11.2.33.15. Are aircraft commanders or their representatives briefed on all hazardous cargo being loaded on the aircraft?

11.2.33.16. Is hazardous cargo annotated on the flight plan?

11.2.33.17. Are the personnel involved with explosives operations properly trained? Do they understand the hazards associated with the operation and the munitions involved? Have they been properly briefed?

Chapter 12

PERSONNEL

12.1. Fatigue. Fatigue causes mishaps. After 48 to 72 hours without sleep, personnel become ineffective. So, the best measure against fatigue is sleep. Water consumption, diet, physical conditioning, and personal hygiene all impact on fatigue. Ensure the impact is positive.

12.1.1. Symptoms of Fatigue. The symptoms manifest themselves in increased errors, difficulty in following instructions, lack of motivation, and carelessness. All this may translate into unnecessary risk-taking or shortcuts to get the job done—an open invitation for a mishap. Watch for the following symptoms of fatigue:

12.1.1.1. Headaches.

12.1.1.2. Poor physical hygiene.

12.1.1.3. Impatience and irritability.

12.1.1.4. Loss of appetite.

12.1.1.5. Inability to focus on task at hand.

12.1.1.6. Outright physical exhaustion.

12.1.1.7. Inability to make decisions.

12.1.2. Facts About Sleep Deprivation:

12.1.2.1. You cannot train to overcome sleep loss.

12.1.2.2. Tasks—even *critical tasks*—that are uninteresting and take a long time are extremely conducive to sleep.

12.1.2.3. Performance of mental tasks requiring calculations, creativity, and ability to plan ahead declines by 25 percent for every 24-hour period of semi-continuous work without sleep.

12.1.2.4. The abilities of leaders are degraded by sleep loss, impacting on quick and effective responses to changing battlefield conditions.

12.1.2.5. Tasks that have been well-learned and repeatedly practiced are more resistant to sleep-loss effects. Therefore, select the best trained to perform critical tasks.

12.1.2.6. The ability to learn *new* information is compromised by sleep loss.

12.1.2.7. Leadership ability cannot overcome sleep loss.

12.1.2.8. Sleep loss over time (greater than 2 days) has a cumulative effect.

12.1.3. Guidelines for Sleep Plans:

12.1.3.1. Six to eight hours' sleep will maintain mental task performance indefinitely.

12.1.3.2. Three to four hours' sleep daily will maintain mental task performance for 5 to 6 days.

12.1.3.3. Less than 4 hours' sleep daily over a 3- to 6-day period will impair effectiveness.

12.1.3.4. Best sleep periods, given limited choice, are 0300 to 0600 and 1600 to 1900.

12.1.3.5. Provide for a *minimum* of 4 to 5 hours' quality (uninterrupted) sleep; however, after 6 to 7 days, accumulated sleep loss will equate to performance of 48 hours without sleep.

12.1.3.6. Allow for naps as often as possible. Four 1-hour naps in a 24-hour period are as beneficial as 4 hours' sleep. However, accumulative sleep loss is more severe with fragmented sleep.

12.1.3.7. Sleep plans should include provisions to recover from sleep loss:

12.1.3.7.1. Twelve hours of sleep or rest (at least 8 to 10 hours' sleep) are required after 36 to 48 hours' acute sleep loss.

12.1.3.7.2. Twenty-four hours of sleep or rest (at least 15 hours' sleep) are required after 36 to 48 hours' sleep loss under conditions of high workload (12 to 16 hours per day). This is particularly important for commanders and staff with high mental task workloads.

12.1.3.7.3. Two to three days of sleep or rest are required after 72 to 96 hours' sleep loss. The sleep or rest period means 8 to 10 hours of sleep per day and light duty.

12.2. Personnel Checklist:

12.2.1. Are people actively involved in the buddy system on- and off-duty, on- and off-base?

12.2.2. Are people briefed to continuously scan to identify potential unsafe acts and conditions to prevent mishaps?

12.2.3. Do supervisors give periodic safety briefings?

12.2.4. Do people use team work for hazard identification and elimination?

12.2.5. Do people know how to use fire extinguishers?

12.2.6. Are people aware of symptoms of carbon monoxide poisoning: headache, dizziness, nausea, vomiting, fainting, chest pain, rapid breathing, shortness of breath, confusion, reddish skin, unconsciousness, convulsions, death?

12.2.7. Are people aware of first aid for carbon monoxide poisoning: removal from exposure area to fresh air, loosen clothing, give CPR if not breathing, keep warm?

12.2.8. Are people billeted off-base in foreign countries aware their construction standards may not be the same as the US?

12.2.9. Are people aware off-base establishments may be heated with kerosene or charcoal in an under-the-floor heating system? (Ventilate rooms to reduce possibility of carbon monoxide poisoning.)

12.2.10. Are personnel briefed on the increased number of personnel, aircraft, and vehicles on and off the base?

12.2.11. Do people exercise extreme caution when walking on the base at night or while running on the open roadway?

12.2.12. When personnel are jogging or walking, do they wear headphones only on running tracks, not when crossing streets or on the open highway?

12.2.13. Do people walk, jog, and run facing traffic?

12.2.14. Are people briefed to exercise extreme caution when riding bicycles over railroad tracks?

12.2.15. Do bicyclists ride single file, with traffic? Do they wear properly secured bicycle helmets?

12.2.16. Are people aware there may be minimal outside lighting?

12.2.17. Do people carry a flashlight after dusk and before dawn and remain on established paths or walkways? Do they wear reflective items?

12.2.18. Do supervisors ensure gas is not used as a cleaning solvent or place flame-producing devices in the presence of flammable materials?

- 12.2.19. Do people monitor themselves and others for complacency?
- 12.2.20. Do people guard against losing their tempers?
- 12.2.21. Do people use crosswalks, if at all possible?
- 12.2.22. Are roof-top parties strictly forbidden?
- 12.2.23. Are people aware of the hazards of drinking and the potential of falling from balconies and out of windows?
- 12.2.24. Do people avoid sleeping in areas where vehicles might be moving off road?
- 12.2.25. Do people wear personal protective equipment when required or when it reduces the chance of injury?
- 12.2.26. Are base personnel aware of unusual hazards to the base populace due to possible airdrops and jumpers?
- 12.2.27. Are people briefed that static electricity is much greater during cold, dry seasons than during warm, humid ones?

Chapter 13

TOOLS

13.1. Heat Effects on Tools and Materials:

13.1.1. Ensure gloves are worn when working with metal tools and materials exposed to the sun.

13.1.2. Remind personnel to:

13.1.2.1. Take into account expansion and contraction of metal tools and materials. (Metal will contract during cool nights and expand during hot days).

13.1.2.2. Check wire rope and bolt torque specifications to minimize varying heat stress and strain effects.

13.1.2.3. Keep sawdust cleaned up in carpentry areas. Sawdust fires occur frequently in hot, dry climates.

13.1.2.4. Frequently inspect wooden items such as shovel, ax, and hammer handles for shrinkage from extreme heat and low humidity. Check and tighten as needed.

13.2. Tools Checklist:

13.2.1. Are consolidated tool kits (CTK) in good condition?

13.2.2. Are missing or broken tools replaced?

13.2.3. Are inventories of tools completed?

13.2.4. Are tool boxes not used to collect foreign objects?

13.2.5. Is a tool control program established?

13.2.6. Does each tool have a cutout to show if it is missing?

13.2.7. Are all CTKs, tools, or equipment not in their designated location accounted for by means of a chit, sign-out log, hand receipt, etc.?

13.2.8. Is a CTK-continuity folder maintained according to existing directives?

13.2.9. Are lost tool reports properly and promptly filled out?

13.2.10. Are required special tools and test equipment available?

13.2.11. Have procedures been established to track due dates on calibration of special equipment or measuring tools in use?

13.2.12. Are the calibration and condition of precision measuring equipment in use and (or) located in the CTK tool room checked?

13.2.13. Have adequate bench stocks been established? Are items controlled, properly maintained, and separated into bins?

13.2.14. Are adequate copies of pertinent technical orders available and are they in serviceable condition and current?

13.2.15. Have procedures been established to check calibration of tire gauges before and after use and to document these checks?

Chapter 14

RAPID RUNWAY REPAIR (RRR)

14.1. General. Filling craters and repairing a taxiway or runway can be hazardous work even in peacetime. Listed below are many of the potential hazards which may be found.

14.2. Components of the Aluminum Matting (AM-2) RRR Patch Kit:

14.2.1. RRR patch kits are held as War Reserve Material (WRM) at critical bases in Europe and Korea. Each set contains 9 patch assemblies which can be placed over 9 craters to serve as an emergency parking ramp or taxiway.

14.2.2. These kits contain all the tools needed to assemble the patches:

14.2.2.1. Mats—The large mat is 2 feet by 12 feet by 1 1/2 inches and weighs 144 pounds. The small mat (half mat) is 2 feet by 6 feet by 1 1/2 inches and weighs 72 pounds.

14.2.2.2. Starter Keylock—A narrow strip of matting 4 inches wide with two male edges. It comes in three lengths. The function is to allow bi-directional installation of matting.

14.2.2.3. Locking Bar—The matting is locked together with the locking bar, which is 2 feet by 3/4 inches by 3/16 inches. It is inserted at the leading edge of the joint. The locking bars are also used as temporary spacers for aligning mats by inserting the bar in the top of the groove between panels.

14.2.2.4. Towing Bar Tube—This is a 2-foot long hollow tube with a mat end joint connection on one side. The tube is connected to the mat ends and is used for pulling matting over a crater.

14.2.2.5. Starter Towing Bar Tube—This tube is installed on the mat ends at the starter keylock. This is 1 inch longer than the normal towing tube. This is to compensate for the width of the starter keylock.

14.2.2.6. Mandrel—A steel rod which is inserted in the towing tubes and secured by the towing bar stop and end caps. It also keeps the mat aligned during pulling of the mat.

14.2.2.7. Tow Clamp—A yoke-shaped device of two parts which is bolted together to enclose the towing tube for pulling.

14.2.2.8. Ramp—This is a 6-foot section of tapered matting which attaches to the male side of the mat. The ramp provides a smooth transition from runway surface to matting surface.

14.3. Hazards Of RRR:

14.3.1. Lifting matting weighing 72 or 144 pounds. Support belts may help, however; many people over-rely on them without taking the necessary rest breaks. Proper lifting techniques must be emphasized during training.

14.3.2. Lack of vehicle operator training. Ensure vehicle operators, especially augmentees, are properly trained on special equipment.

14.4. Specific Requirements:

14.4.1. Are all drivers trained on the types of equipment they operate (bulldozer, loader, grader, vibrator compactor, dump truck, sweeper, forklift)? ([Refer to paragraph 14.3.2.](#))

14.4.2. Are personnel properly supervised during RRR?

14.4.3. Has the mat supervisor instructed the forklift operator to place the bundles so the mat laying crew has the shortest carrying distance and the direction of the bundles is correct for the direction being laid so crews do not have to turn each piece around? (The distance from the last row laid to the bundle is calculated so the bundle will be completed by the time the crew gets to that position laying the matting.)

Chapter 15

SPOT INSPECTIONS

15.1. General. In this guide you'll find a number of applicable areas for conducting spot inspections. The Deployment Safety Officer and (or) NCO should conduct some spot inspections of operational and (or) industrial activities and facilities on a daily basis. The inspection should be logged, and in the event a problem is identified, follow-up inspections should be conducted and documented. Remember: If you didn't document it, you didn't do it.

15.2. Safety Inspections. Safety inspections serve to identify hazards and correct them before a mishap occurs. Detailed inspections are carefully planned, and when a hazard is identified and a corrective action is taken, the inspection serves its purpose. Inspection reports should identify the root causes of an observed hazard, not merely the symptoms, to enable corrective action to be applied to a more general area than just the place where the hazard was identified. Spot inspections serve the same purpose, but are more spontaneous, less structured, and serve to examine subject areas at random points in time. This tends to make spot inspections a good barometer of the unit's safety climate.

15.3. Pre-Inspection Requirements. Maintaining a close working relationship with unit personnel is essential for the conduct of an effective safety program, and all functional areas of safety must be involved. Conducting spot inspections provides an excellent opportunity for getting involved in unit activities. Before embarking on an inspection:

15.3.1. Review material applicable to the area to be inspected. Use applicable checklists, if available, during the inspection. Spot inspection checklists do not include every item that may be observed and may not necessarily be referred to in a step-by-step fashion.

15.3.2. When arriving in the area, contact the area supervisor before starting the spot inspection.

15.3.3. Explain that it is a spot inspection, and if requested, show them your checklist, if you have it with you. (Spot inspections are not covert actions by a hostile force.)

15.4. Documentation. Use a log to document your spot inspections, even if no hazards are discovered.

15.5. Re-Inspections. Be sure to re-inspect the areas where hazards are found to ensure corrective actions are taken and remain effective.

15.6. Responsibilities. In general, all Air Force employees must:

15.6.1. Comply with all US Air Force, Occupational Safety and Health Administration (OSHA), and AFOSH standards.

15.6.2. Promptly report safety, fire, and health hazards to their supervisor and to a safety representative as soon as possible.

15.6.3. Promptly report occupational injuries and illnesses to supervisors.

15.6.4. Wear or use required protective clothing and (or) equipment.

15.6.5. Take adequate care while doing assigned tasks.

Chapter 16

COMMUNICATIONS

16.1. Antennas:

16.1.1. Remind personnel that, when erecting antennas, they must stay *twice* the distance from power lines as the length of the antenna.

16.1.2. Stress that personnel have been killed by falling antenna-head sections.

16.1.3. Require that personnel wear eye and face protection and gloves when erecting antennas.

16.1.4. Allow no substitutes for antenna-mast sections (camouflage poles have been a fatal alternative).

16.1.5. If, for any reason, an assembled antenna-head must be left on the ground, ensure it is guarded to prevent others from walking into it. Tip protectors are a must.

16.2. Power Lines:

16.2.1. Identify power lines in operational areas to *all personnel*.

16.2.2. Tie down antennas when in areas of power lines (antenna tip should be no lower than 7 feet to avoid eye injuries). Use tip protectors at all times.

16.3. Electrical Storms:

16.3.1. If possible, do not operate radios, telephones, or switchboards during electrical storms.

16.3.2. Disconnect electrical equipment from power sources and antennas, if the situation permits.

16.3.3. If equipment *must* be used, converse as little as possible. Return the call after the storm.

Chapter 17

PETROLEUM, OILS, AND LUBRICANTS (POL)

17.1. The preservation of fuel quality, minimization of losses, air pollution control, and safety of operation are all important considerations in the design and construction of fuel storage facilities. Storage tanks are required to provide an operating and reserve supply of fuel at almost all Air Force bases. At certain air bases, because of the proximity of the enemy lines, the predicted enemy threat, or the mission duration of the airfield, it may not be practical to store POL products at forward or battle area airfields. Aviation and ground POL products are normally stored in 55-gallon drums, collapsible bladders, or steel-welded or bolted tanks.

17.2. Steel drums of 55-gallon capacity are used for fuels and lubricants. For storage, drums are segregated by type and grade of fuel and stacked on their sides in rows. For engine fuels, each area of five rows is surrounded by a dike or a ditch to provide isolation in case of fire. For oils and lubricants, the requirements are similar except six rows of 300 drums each may be placed in each area and protective dikes and ditches are omitted.

17.3. Synthetic-rubber-impregnated fabric containers may be used for storage of liquid fuels. Containers should be installed on level ground, free of rocks or other sharp objects, and surrounded by dikes or ditches capable of holding 125 percent of the container capacity.

Chapter 18

AFTER-ACTION REPORT

18.1. Recommend an after-action report be completed after any deployment or contingency operation. Information in after-action reports can be used during other operations and can be shared with representatives of other organizations who will be involved in a similar operation or an operation that takes place in the same locality.

18.2. Suggest an after-action report contain, as a minimum, the following items. Each organization can include additional material, as required.

18.2.1. Synopsis of deficiencies noted during inspections (categorize)?

18.2.2. What didn't work?

18.2.3. Successes (what worked)?

18.2.4. Priority items (what to do right away)?

FRANCIS C. GIDEON, JR., Maj Gen, USAF
Chief of Safety

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

Air Force Instruction (AFI) 23-201, *Fuels Management*.

AFI 91-202, *The US Air Force Mishap Prevention Program*.

AFI 91-204, *Safety Investigations and Reports*.

AFI 91-207, *The US Air Force Traffic Safety Program*.

AFI 91-213, *Operational Risk Management (ORM) Program*.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*.

AFI 91-302, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Standards*.

Air Force Joint Manual (AFJMAN) 24-204, *Preparing Hazardous Materials for Military Air Shipments*.

Air Force Manual (AFMAN) 32-4005, *Personnel Protection and Attack Actions*.

AFMAN 91-201, *Explosives Safety Standards*.

Air Force Pamphlet (AFPAM) 91-214, *Operational Risk Management (ORM) Implementation and Execution*.

AFPAM 91-215, *Operational Risk Management (ORM) Guidelines and Tools*.

Technical Order (TO) 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*.

TO 11A-1-33, *Maintenance and Handling of Explosive Loaded Aircraft*.

TO 11A-1-46, *Fire Fighting Guidance, Transportation, and Storage*

Abbreviations and Acronyms

AF—Air Force

AFFF—Aqueous Film Forming Foam

AFI—Air Force Instruction

AFJMAN—Air Force Joint Manual

AFMAN—Air Force Manual

AFOSH—Air Force Occupational Safety and Health

AFSC—Air Force Safety Center

AGE—Aerospace Ground Equipment

AIG—Address Indicator Group

AIM-9—Air Interceptor Missile-9

AWG—American Wire Gauge

BASH—Bird Aircraft Strike Hazard

BWS—Base Weather Station

CAPA—Combat Aircraft Parking Area

CB—Chemical-Biological

CE—Civil Engineering

CPR—Cardiopulmonary Resuscitation

CTK—Consolidated Tool Kit

DoD—Department of Defense

DFP—Defensive Fighting Positions

DOT—Department of Transportation

DRU—Direct Reporting Unit

EET—Exercise Evaluation Team

EOD—Explosive Ordnance Division

EOR—End of Runway

ERO—Engine Running On-Load and Off-Load

F—Fahrenheit

FOA—Field Operating Agency

FOD—Foreign Object Damage

FSSZ—Fuel Servicing Safety Zone

HAP—High Accident Potential

HATR—Hazardous Air Traffic Report

HQ—Headquarters

ICT—Integrated Combat Turn

IDP—Installation Deployment Plan

IFE—In-Flight Emergency

IPe—Individual Protective Equipment

IPI—In-Process Inspection.

kph—Kilometers Per Hour

LIMFACS—Limiting Factors

LOX—Liquid Oxygen

MAJCOM—Major Command

MER—Multipiece Ejector Rack

MHE—Materials Handling Equipment

MOC—Maintenance Operations Center

MOPP—Mission-Oriented Protective Postures

mph—Miles Per Hour

MRE—Meals Ready to Eat

NBC—Nuclear, Biological, Chemical

NCO—Non-Commissioned Officer

NEW—Net Explosives Weight

nm—Nautical Miles

OPLAN—Operation Plan

ORM—Operational Risk Management

OSHA—Occupational Safety and Health Administration

PDO—Publishing Distribution Office

POC—Point of Contact

POL—Petroleum, Oils, and Lubricants

PPE—Personal Protective Equipment

PWP—Powered White Phosphorous

RAC—Risk Assessment Code

RAPCON—Radar Approach Control

RRR—Rapid Runway Repair

SOF—Supervisor of Flame

SPF—Sun Protection Factor

SPV—Special Purpose Vehicle

STARTEX—Start Exercise

TER—Triple Ejector Rack

TO—Technical Order

TOX—Toxicology

T/R—Thrust Reverser

US—United States

USAF—United States Air Force

UV—Ultraviolet

UXO—Unexploded Ordnance

WP—White Phosphorous

WRM—War Reserve Material

WWW—World-Wide Web

Terms

Bare Base—A base having minimum essential facilities to house, sustain, and support operations to include, if required, a stabilized runway, taxiways, and aircraft parking areas. A bare base must have a source of water that can be made potable.

Beddown—Common terminology used for the destination of combat forces in a theater (equivalent to a destination).

Contingency—An emergency involving military forces, caused by natural disasters, terrorists, subversives, or by required military operations. Contingencies require plans, rapid response, and special procedures to ensure the safety and readiness of personnel, installations, and equipment.

Contingency Operations—Operations involving the use of US military forces to achieve US objectives, usually in response to an emerging or unexpected crisis. Contingency operations may evolve into sustained military operations.

Deployment—The relocation of forces to designated areas of operations.

Deployment Planning—That part of operation planning concerned with relocation of forces to the desired area of operation.

Hazard—Any real or potential condition that can cause mission degradation, injury, illness, death to personnel or damage to or loss of equipment or property.

Hazardous Cargo—Explosives and other hazardous articles such as flammable liquids and solids, oxidizing materials, corrosive materials, compressed gases, poisons, irritating materials, etiologic agents, radioactive material, and other unregulated cargo.

Hazardous Materials—A substance or material that is capable of posing an unreasonable risk to health, safety, and property when transported and has been so designated by AFJMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments*. May also be referred to as hazardous cargo or dangerous goods.

Heat-Related Illnesses—Heat-related illnesses such as fainting from heat, heat exhaustion, and heat stroke are far more serious than a sunburn. These conditions occur when workers become very overheated and dehydrated, and in many cases, they are accompanied by sunburn. The following may be symptoms of heat-related illnesses: nausea, vomiting, fainting, high fever, delirium, or diarrhea, and medical care may be needed.

Host Unit—The organization designated by the host MAJCOM or HQ USAF to furnish support to a tenant unit. The host unit develops, publishes, and maintains the base mobility guidance to support the deployment of Air Force units from a particular base.

Marshaling Area—The geographic location where a deploying unit will assemble, hold, and organize supplies and (or) equipment for onward movement.

Melanin—The protective chemical in the skin that reflects and absorbs ultraviolet (UV) rays and causes tanning. Yellow and red melanins found in light-skinned persons provide the least amount of sun protection. Brown and blue-black melanins found in darker-skinned persons reflect the most UV and provide the most sun protection.

Mishap—An unplanned event or series of events resulting in death, injury, occupational illness, or damage to or loss of equipment or property.

Operation Plan (OPLAN)—A plan for one or more operations that deployed units carry out simultaneously or in a series of connected stages. Higher authorities normally issue OPLANs as directives based on stated assumptions to allow subordinate officers to prepare support plans and orders.

Revet—To face, as an embankment, with masonry or other material.

Risk—An expression of consequences in terms of the probability of an event occurring, the severity of the event and the exposure of personnel or resources to potential loss or harm. A general expression of risk as a function of probability, severity, and exposure can be written as: $\text{Risk} = f(P, S, E)$.

Risk Assessment—The process of detecting hazards and their causes, and systematically assessing the associated risks.

Risk Control—An action designed to reduce risk by lowering the probability of occurrence and (or) decreasing the severity of an identified hazard.

Severity—The expected consequences of an event in terms of mission impact, injury, or damage.

Sun Protection Factor (SPF)—The ratio between the time it usually takes your skin to sunburn and how long it takes if you've applied the sunscreen. For example, a SPF of 15 will provide 15 times the amount of protection you'd get without using anything.

War Reserve Material (WRM)—Material required, in addition to mobility equipment and primary operating stock, to support wartime activities reflected in the US Air Force War and Mobilization Plan until the industrial base has generated sufficient deliveries to equal planned wartime consumption.

Attachment 2

SAFETY BRIEFINGS

A2.1. Deployment Briefing Operational Risk Management Considerations:

A2.1.1. Operational Risk Management applies to everyone – on and off duty. Identifying risks is everyone's job.

A2.1.2. General items to consider: Are individuals familiar with the deployment area? If not, safety concerns must be covered in greater detail. Here are some general heads up concerns:

A2.1.2.1. Time differences. If traveling across time zones, you will experience some degree of fatigue and disorientation. "Jet lag" can be minimized by doing the following:

A2.1.2.1.1. Avoid alcohol during the flight; it tends to dehydrate your body, adding to your fatigue.

A2.1.2.1.2. Do you have time to adjust to the new time zone prior to departure? If not, adjust your eating and sleeping habits incrementally during flight (as long as you're not the pilot).

A2.1.2.1.3. Upon arrival, adjust to the new time and work schedule as quickly as possible.

A2.1.2.2. Weather. Check on the destination weather. Aside from bringing appropriate clothing, find out if there are any unusual conditions you need to prepare for (for example, suntan lotion, insect repellent, etc.). **NOTE:** Commanders—unit-issued clothing (parkas, desert tans...) are they ready to go in sufficient quantities?

A2.1.2.3. Driving. Driving has the greatest potential for on- and off-duty mishaps. What side of the road do the cars drive on? What are the road conditions? Are speed limits mph or kph? Do pedestrians have the right of way? Do you share the roadways with Army convoys of tanks or hundreds of BMWs? Will operators need additional training and (or) license?

A2.1.2.4. Food. The basic question is, can I eat and drink off the base? Can fruits, vegetables, and meats purchased off-base be eaten? Are there any items such as certain alcohol or over-the-counter drugs that contain controlled substances?

A2.1.2.5. Local Customs and Hazardous Situations or Conditions. Check with your intelligence officer. Are the people generally friendly to Americans in general and military personnel in particular? Are there any taboo actions likely to cause friction with local inhabitants? Are there any revolutionary groups or terrorists? Is there a curfew and what areas are off limits? Chances are you are not familiar with the contingency location. You

might be in an area where it is not a good idea to go off sightseeing or “out on the town” by yourself. One other thing to consider is that respect for authority is considered important in many areas of the world. If a policeman stops you, cooperate fully.

A2.2. Pre-Departure:

A2.2.1. If a mass pre-departure brief is scheduled, brief any specifics you have for the deployed location. Take this opportunity to introduce the Deployment Safety Officer and (or) NCO so participating personnel will know who to contact should the need arise.

A2.2.2. Have local establishments frequented by deployed personnel been evaluated for potential risk?

A2.2.3. Have personnel received an orientation course for the local area if they are going to drive during the deployment?

A2.2.4. Are personnel reminded to wear seat belts at all times while riding in a vehicle?

A2.2.5. Are personnel reminded not to drink and drive?

A2.2.6. Have personnel received instructions for reporting all mishaps to their supervisors or assigned safety personnel?

A2.2.7. Have personnel received instructions on clothing requirements at deployed locations for both on- and off-duty?

A2.2.8. Are personnel deploying with personal transportation (bicycles) aware of the benefits of wearing a helmet? The deployment commander should evaluate the risk associated with bicycles.

A2.3. Deployed Living Conditions:

A2.3.1. If personnel are billeted in a tent city, has the tent city checklist been used?

A2.3.2. Do sleeping facilities have smoke detectors?

A2.3.3. If the facility is over one story, does it have installed sprinkler systems?

A2.3.4. If personnel are billeted in a hotel, brief them on:

A2.3.4.1. Fire evacuation plan.

A2.3.4.2. Meeting location in case of evacuation.

A2.3.4.3. How and where to seek medical care.

A2.3.4.4. Whether or not the hotel's water is potable.

A2.4. Local Conditions. Brief personnel on the following:

A2.4.1. Overall environment;

A2.4.2. Altitude (cautions about high altitude disorders or problems that can arise at sea level—such as high tide dangers);

A2.4.3. Extreme heat or cold dangers;

A2.4.4. Poisonous plants, reptiles, or insects; and

A2.4.5. Native wild animals.

Attachment 3

MOBILITY CONCEPT BRIEFING

A3.1. Review the following items:

A3.1.1. Wear seatbelts at all times and insist your passengers wear them. Make sure they are worn properly.

A3.1.2. Do not smoke within 50 feet of an aircraft or within 100 feet of an aircraft during refueling operations.

A3.1.3. Use ear protection when in a hazardous noise environment.

A3.1.4. Always wear reflective material (belts or vests) during the hours of darkness.

A3.1.5. Do not wear rings on the job and do wear gloves when working around aircraft (loading etc.).

A3.1.6. Pick up FOD—don't walk over it.

A3.1.7. Ensure personnel know the following:

A3.1.7.1. During all concurrent-aircraft refueling operations the refueling supervisor is in charge.

A3.1.7.2. All personnel entering the refueling area must first check in with this supervisor.

A3.1.7.3. Be sure to ground yourself before entering the aircraft.

A3.1.7.4. Some people enter refueling areas inadvertently. You can avoid this by being aware of where you are at all times.

A3.1.8. Always use spotters and chocks when backing vehicles in close proximity of an aircraft.

A3.1.9. Do not allow anyone to walk, park, or drive behind an aircraft that is being loaded or unloaded.

A3.1.10. Fight the tendency to cut corners and hurry excessively. This tendency will usually result in injury or damage to someone or something, and a late departure is preferable to injury or damage in all cases.

A3.1.11. Re-familiarize yourself with fire prevention practices and use of fire extinguishers.

A3.2. Use common sense—if it can't be done safely, STOP and re-evaluate your operation.

Attachment 4

MISHAP NOTIFICATION PROCEDURES

A4.1. General.

A4.1.1. Air Force mishap reports are used to identify problem areas and to prevent mishaps from recurring. Because of their importance, you must be familiar with the required reporting procedures. If a mishap meets reportable criteria, you must collect the required information to ensure required reports meet suspense times.

A4.1.2. Mishap notification procedures are established to ensure prompt and accurate notification of flight, ground, and weapons mishaps.

A4.1.3. As Deployment Safety Officer or NCO, establish internal mishap reporting procedures for the deployment commander. The commander is relying on you to notify home station and up the chain of safety command when mishaps occur at the deployment site.

A4.1.4. Communicate with deployed medical personnel on a regular basis to ensure reportable injuries and illnesses are identified and proper documentation is initiated.

A4.1.5. Establish liaison with the host safety officials to ensure immediate two-way communication of mishaps.

A4.2. Reportable Mishaps. If a reportable mishap occurs, the following are some reminders:

A4.2.1. Remind the mission commander of toxicology (TOX) testing requirements, if the mishap is an aircraft operations mishap or any mishap where personnel might have contributed to the cause of the mishap. Check availability of TOX testing at the deployed location.

A4.2.2. Remind the aircraft commander to complete a statement of the mishap. Collect any information that might be of any possible use to the report writer. Have each participant and witness provide a brief written statement of what happened, the sequence of events, and what was done to handle the situation, what they were doing at the time of the mishap, and anything else of importance they might want to add. If the mishap is aircraft-operations related, remind personnel the statements are provided and protected under executive privilege, for safety use only, and cannot be used for any form of punishment.

A4.2.3. If a still camera or video equipment is available, have the damage and ground scars photographed for possible future use. Depending on your location, you may have to borrow a personal camera and find someone good at taking pictures or take them yourself.

A4.2.4. Contact the nearest Air Force Safety Office and discuss the mishap with them. They will be familiar with AFI 91-204 and should be able to give you the necessary guidance.

A4.2.5. Do not attempt to put a safety message out if you have not been trained to do so. Gather the information and contact your home station or the nearest Air Force Safety Office. Include a “FOR OFFICIAL USE ONLY” on statements of the mishap.

A4.2.6. ENSURE THE MISSION COMMANDER IS AWARE OF THE MISHAP AND YOUR INTENTIONS.

A4.3. Safety Response:

A4.3.1. Respond to the established entry control point, assembly point, or directly to the site to secure evidence.

A4.3.2. Notify the on-scene commander of your availability and stand by to provide assistance.

A4.3.3. Notify the host safety office and request assistance, if required.

A4.3.4. Notify home unit command post and safety office. Ensure OPREP-3 is initiated, if required, from the host deployed command post, home unit command post, or the US Embassy.

A4.3.5. Photograph damage and (or) abnormality, as required.

A4.3.6. Determine requirement for aircraft impoundment through the deployment commander and maintenance officer.

A4.3.7. Complete a mishap worksheet, if required.

A4.4. Class A and B Mishaps:

A4.4.1. Initiate actions contained in your unit mishap response plan for Class A and B mishaps.

A4.4.2. Notify home station command post of mishap as soon as possible.

A4.4.3. Ensure TOX tests are initiated for all personnel if an aircraft is involved or alcohol use is suspected in any other mishap.

A4.4.4. Ensure an interim board is convened immediately, if required.

A4.4.5. Immediately impound required records and fuel samples.

A4.4.6. Ensure appropriate messages are submitted according to AFI 91-204.

A4.5. Class C Mishaps:

A4.5.1. Initiate actions contained in your unit mishap response plan for Class C mishaps.

A4.5.2. Ensure mishaps are investigated and information is forwarded to home station for proper reporting.

A4.6. Class D Mishaps:

A4.6.1. Dollar value is more than \$2,000 but less than \$10,000.

A4.6.2. Complete required messages.

A4.7. High Accident Potential (HAP) Mishaps:

A4.7.1. Dollar value is less than \$2,000 but the mishap is deemed important for crosstell.

A4.7.2. Complete required messages.

A4.8. Birdstrikes:

A4.8.1. Retain all bird remains for analysis.

A4.8.2. Ensure birdstrike worksheet is completed and retained.

A4.8.3. Report damaging birdstrikes according to AFI 91-204.

A4.9. Dropped Objects:

A4.9.1. Work with maintenance in reporting the incident.

A4.9.2. Ensure all details are logged, including location (latitude and longitude) where object was dropped.

A4.9.3. Notify local and home station command post and safety office.

A4.9.4. Ensure OPREP-3 is completed, if required.

A4.9.5. Impound aircraft, if required.

A4.10. Hazardous Air Traffic Reports (HATR):

A4.10.1. Ensure circumstances meet the requirements for the filing of a HATR.

A4.10.2. Ensure reporting pilot completes AF Form 651, **Hazardous Air Traffic Report (HATR)**.

A4.10.3. Notify the host safety office or nearest safety office as soon as possible.

A4.10.4. Contact the U.S. Defense Attaché Office for help, if required.

A4.10.5. Notify your unit safety office and they will handle the investigating and reporting administration.

A4.11. FOD Incident:

A4.11.1. Log all details on worksheets.

A4.11.2. Work with the deployed maintenance officer.

A4.11.3. Determine probable mishap class based on the extent of damage to the aircraft and cost estimates.

A4.11.4. Notify host and home station safety office.

A4.11.5. Complete required messages.

Attachment 5

SAMPLE DEPLOYMENT OPERATIONAL RISK ASSESSMENT MATRIX

To determine the amount of risk involved in your operation during this deployment, circle the number corresponding to the known hazards listed on the charts. Then total all the numbers to get a final idea of how risky the deployment will be. Check the risk gauge at the end to determine how much risk is involved. Take action to eliminate or reduce risks whenever possible.

1. PLANNING

GUIDANCE	PREPARATION		
	IN-DEPTH	ADEQUATE	MINIMAL
VAGUE	3	4	5
GENERAL	2	3	4
SPECIFIC	1	2	3

2. HUMAN FACTORS

LIVING CONDITIONS	DUTY CYCLE		
	NORMAL	EXTENDED	MAXIMUM
FIELD	3	4	5
HARD BILLETS	2	3	4
HOME STATION	1	2	3

3. CLIMATE

PROTECTION	CONDITIONS		
	GOOD	MODERATE	SEVERE
NONE	3	4	5
PARTIAL	2	3	4
FULL	1	2	3

4. COMPLEXITY

COMMAND AND CONTROL	OPERATIONS		
	SIMPLE	ROUTINE	COMPLEX
JOINT	3	4	5
BILATERAL	2	3	4
UNILATERAL	1	2	3

5. PERSONNEL

SUPERVISORS	SUBORDINATE		
	HIGHLY QUALIFIED	QUALIFIED	TRAINING
INEXPERIENCED	3	4	5
EXPERIENCED	2	3	4
HIGHLY EXPERIENCED	1	2	3

6. OPS TEMPO

GENERATION	UTILIZATION RATE		
	LOW	MEDIUM	HIGH
MAXIMUM	3	4	5
NORMAL	2	3	4
MINIMUM	1	2	3

7. OPERATING LOCATION

SUPPORT	FACILITIES		
	OPTIMAL	ADEQUATE	MINIMAL
NONE	3	4	5
PARTIAL	2	3	4
FULL	1	2	3

1. PLANNING	
2. HUMAN FACTORS	
3. CLIMATE	
4. COMPLEXITY	
5. PERSONNEL	
6. OPS TEMPO	
7. OPERATING LOCATION	
TOTALS	

RISK GAUGE

7-14	15-21	22-28	29-35
GREEN	YELLOW	ORANGE	RED
LOW	LOW CAUTION	HIGH CAUTION	HIGH RISK